34th Year APRIL, 1950

# RUBBER AGE


## TODAY'S ECONOMY.....

*SOFT CARBON BLACK LOADING IN NATURAL RUBBER*

# THERMAX

AND

# P-33

**THERMAX** *a medium thermal black* — **mixes easily into rubber (Lowers power cost). Permits high loading without affecting quality.**

**P-33** *a soft reinforcing carbon* — **gives low stiffening effect to rubber. Mixes easily into rubber with low heat generation and power cost.**

**R. T. VANDERBILT CO. INC.**

**230 Park Avenue, New York 17, N. Y.**

***Need a mold lubricant, wetting agent, latex stabilizer?***

# There's a DU PONT AQUAREX to fit your exact needs

1

**AQUAREX D**—Molds break cleanly and easily when lubricated with dilute aqueous solutions of this dry powder. In latex compounds it is an excellent stabilizer and wetting agent; increases penetrating power of impregnating compositions; effective for increasing fluidity of dispersions, slurries or pastes of insoluble dry powders.

2

**AQUAREX MDL PASTE**—Where an aqueous-paste is preferred, Aquarex MDL Paste can be used to replace Aquarex D. While their properties are very similar, Aquarex MDL Paste has a substantially lower percentage of electrolyte than Aquarex D. Where *minimum* electrolyte content is required, AQUAREX ME, a dry powder, is recommended.

3

**AQUAREX L PASTE**—Specifically developed as a corrosion-inhibiting mold lubricant. Tests show Aquarex L Paste does *not* contribute to corrosion of steel. In fact, tests indicate it even protects steel from corrosion by dilute mineral acids. Because it is so effective for mold release, solutions of low concentrations are practical.

4

**AQUAREX NS**—An amphoteric stabilizer for use in most types of latex compounds. Can be used in low pH compounds for dipping, gelation molding or adhesives, since it is effective even in acid systems. Useful in spreading or combining compositions, since it is an excellent stabilizer with lower wetting power than Aquarex D.

**For samples and complete information on Du Pont Aquarexes, see your Du Pont representative or write: E. I. du Pont de Nemours & Co. (Inc.), Rubber Chemicals Division, Wilmington 98, Delaware.**

## DU PONT RUBBER CHEMICALS

E. I. du Pont de Nemours & Co. (Inc.),
Wilmington 98, Delaware

DU PONT
REG. U. S. PAT. OFF.

**BETTER THINGS FOR BETTER LIVING**
***...THROUGH CHEMISTRY***

**Tune in to Du Pont "Cavalcade of America," Tuesday Nights—NBC Coast to Coast**

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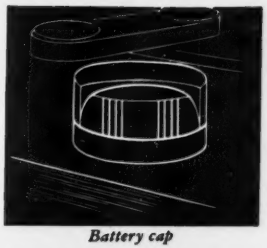
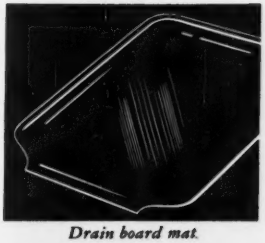
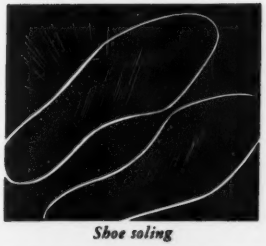


*Battery cap*

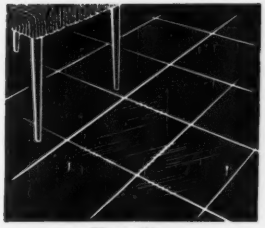


*Drain board mat.*

*Strainer for kitchen use*



*Shoe soling*



*Floor tiling*

# Good-rite

REG. U. S. PAT. OFF.

## RESIN 50

**easy-processing, reinforcing agent**

# Improves your rubber compounding

**. . . gives faster, smoother extrusions**

**. . . saves time by eliminating masterbatching**

Here's a reinforcing agent that helps rubber compounders make important savings—in a broad range of profitable products. Typical examples are shown here.

Good-rite Resin 50 provides an entirely new compounding approach to hardness problems . . . a simple means, for example, of filling in the gap between soft rubber compounds and ebonites.

Primarily a reinforcing agent, Good-rite Resin 50 has many extra advantages. It eliminates masterbatching, improves extrusions. It gives better flex life, higher elongation, better abrasion resistance. It makes rubber compounds more easily handled because it acts as a plasticizer at processing temperatures.

Made as a white, free-flowing powder, Good-rite Resin 50 can be compounded in a wide variety of attractive colors. Write for technical bulletin. Find out how Resin 50 may help you make more and better products at cost-savings. Please address Dept. CA-2, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio.

**Hycar**

Reg. U. S. Pat. Off.

*American Rubber*

**B. F. Goodrich Chemical Company**

A DIVISION OF THE B. F. GOODRICH COMPANY

**GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers**

# *For stronger tubes, tire makers say, Improvement's great with* **Philblack* A!**

Philblack A gives tubes remarkable tensile strength . . . and definitely superior tear resistance even at high operating temperatures! For wonderfully smooth extrusions, which retain their pliancy and resilience after vulcanization—for tubes which stay lively longer and resist chafing . . . use this versatile MAF black.

MAF means *Medium Abrasion Furnace*. This new classification has been adopted for Philblack A because this black imparts abrasion resistance exceeded only by the HAF and channel blacks. This versatile furnace black, Philblack A, has not been changed—it is still the same easy processing, smooth extruding black which produces high modulus stocks. The new term "MAF" will distinguish Philblack A from other quite different blacks in the HMF category.

## PHILLIPS CHEMICAL COMPANY

*PHILBLACK SALES DIVISION*

EVANS BUILDING · AKRON 8, OHIO

Warehouses in Akron, Boston, Chicago and Trenton. West Coast agent: Harwick Standard Chemical Company, Los Angeles. Canadian agent: H. L. Blachford, Ltd., Montreal and Toronto.

*A Trademark

# NO. 1

# among rubber reinforcing resins

## Your best buy is PLIOLITE S-6

FIRST choice as reinforcing resin is Pliolite S-6—Goodyear's copolymer resin that improves stiffness, tensile, tear, hardness, flex-life and abrasion resistance in black and non-black loaded natural and synthetic stocks.

It's used extensively in shoe soles, flooring, electrical wire and cable insulation, rubber hose and tubing, inflated and molded rubber goods. Reasons for the popularity and leadership of Pliolite S-6 are in the panel at the right.

If these properties are what you're looking for, then try Pliolite S-6. Write for full details and samples to:

**GOODYEAR, CHEMICAL DIVISION**
**AKRON 16, OHIO**

- **EASY INCORPORATION** *on mills or in Banburies*
- **WIDE COMPATIBILITY** *with natural and synthetic rubbers*
- **LIGHT-COLORED, NON-DISCOLORING**—*can be used in light-colored stocks*
- **HIGH HARDNESS**—*produces compounds from 70 to 100 durometer hardness*
- **EXCELLENT REINFORCEMENT**—*adds stiffness, hardness to toughness of rubber*
- **EXCELLENT ELECTRICAL PROPERTIES**—*makes it a valuable component in insulation, etc.*
- **EXCELLENT FLEX-LIFE**—*prolongs flex-life of all rubber compounds*
- **HELPS PROCESSING**—*stocks have good processability and moldability*

*Pliolite—T.M. The Goodyear Tire & Rubber Company

**Pliolite S-6** *is available in two forms:* powder *in 50-lb. bags or 200-lb. drums, and* masterbatch *in cartons—a thorough dispersion of the resin in rubber.*

PLIOLITE S-6 USE PROVED *Products*

GOODYEAR

*We think you'll like "THE GREATEST STORY EVER TOLD"—Every Sunday—ABC Network*

# HERECROL

REG. U. S. PAT. OFFICE

## A SYNTHETIC RUBBER

of the acrylonitrile type manufactured under U. S. Patented process and supplied by the Heresite & Chemical Company.

### HERECROL IS AVAILABLE AS FOLLOWS:

1. Latex.
2. Compound — not cured.
3. Sheet form.
4. Liquid for coating purposes.

### SPECIAL PROPERTIES OF HERECROL:

1. Excellent solvent, oil, and chemical resistance.
2. High tensile strength and elongation.
3. High resistance to oxidation and aging.
4. Wide temperature range of service.

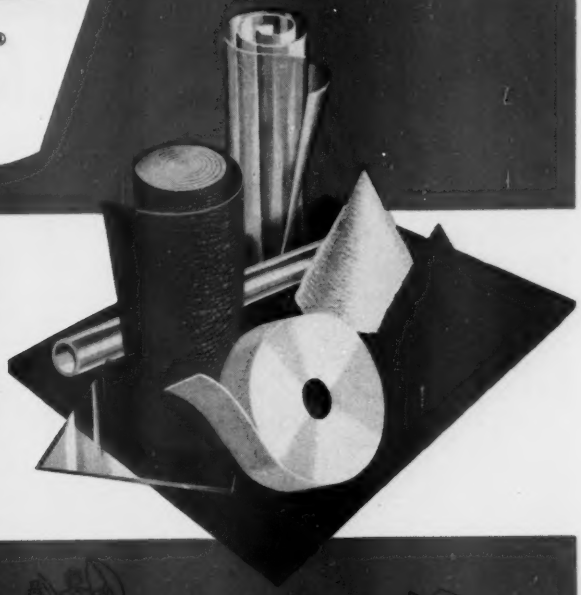
**For full information and free sample write to**

## HERESITE & CHEMICAL COMPANY

**MANITOWOC, WISCONSIN**

# marvinol®

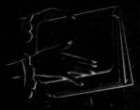
## Vinyl & Versatile



Extruders of wire insulation, tubing, belting and other continuous shapes benefit from Marvinol's faster extrusion.

Processors find in Marvinol the highest molecular weight resin processable in present equipment.

Superior dimensional stability makes Marvinol ideal in products that must not shrink or deform under heat.



Marvinol's extra toughness and dryness makes plastics products more durable and pleasant to touch.

OTHER PRODUCTS OF NAUGATUCK CHEMICAL:
Latex • Dispersions • Reclaimed Rubber • Plastics
Synthetic Rubber • Rubber Chemicals • Agricultural Chemicals and Aromatics

Marvinol's superior flexibility in low temperatures goes all in products subjected to severe exposure and cold weather.

In products that must resist chemical and abrasive action, Marvinol — fortified against oil, acids, water, heat —

Marvinol may be extruded, calendered, injection molded, compound for protective coating and dust molding.

The entire efforts of our modern development laboratories are for our customers' benefit. All the formulation, compounding and processing information developed here is at your disposal since it is only through you that Marvinol-based products reach the consumer market. So write for the latest technical information today to Dept. R-4, NAUGATUCK CHEMICAL, 501 E. Preston St., Baltimore 2, Maryland.

Field engineers and customer research laboratories provide helpful technical service to Marvinol users.

Marvinol

NAUGATUCK CHEMICAL

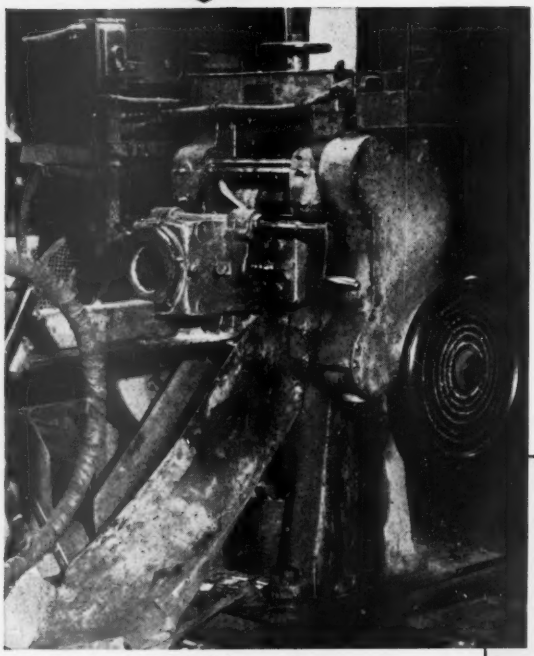
DIVISION OF UNITED STATES RUBBER COMPANY

# 10 years continuous operation...without repairs

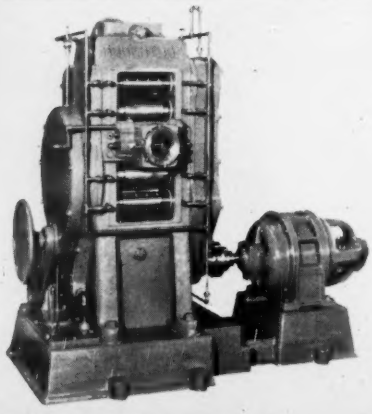
# ROBERTSON'S
## LEAD SHEATH STRIPPING MACHINE
## *makes still another satisfied customer*

Stripping and reclaiming lead sheath is an important process in the manufacture of vulcanized rubber hose. For this work Whitehead Bros. Rubber Company of Trenton, N. J. installed a Model G "stripper" 9 years ago. Referring to this unit, Whitehead Bros. recently wrote, ". . . we have had it in continuous operation since sometime in 1940 . . . and aside from replacing the knives over the past eight years, there has been no other expense involved in the maintenance of this machine."

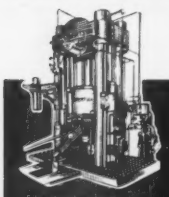
Today, companies using Robertson hose encasing equipment are turning out a sizable amount of the world's rubber hose. Like Whitehead Bros. Rubber Company, these firms have found Robertson machines always efficient . . . always economical to operate.



The above unretouched photo was taken very recently in the plant of Whitehead Bros. Rubber Co. of Trenton, N. J.

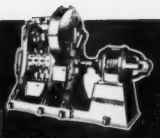


**AND THE NEW MODEL IS EVEN BETTER!**



Hose Lead Encasing Press

Open Lead Melting Pot



Hydraulic Pump

JOHN Robertson COMPANY INCORPORATED

135 WATER STREET, BROOKLYN 1, NEW YORK

Designers and Builders of all Types of Lead Encasing Machinery

Since 1858

# THE DEMAND FOR

## Crystex Insoluble Sulphur

## IS

# GROWING

The chief reason why more CRYSTEX Insoluble Sulphur is being used each year is that rubber manufacturers find that its use gives them a better product . . . economically.

CRYSTEX is 85% insoluble in Carbon Bisulphide and, on a per unit basis, it is the most economical insoluble sulphur on the market.

Write for generous testing sample and a copy of the CRYSTEX Insoluble Sulphur Circular.

Stauffer CHEMICALS SINCE 1885

OTHER RUBBERMAKERS' CHEMICALS

- Commercial Rubbermakers' Sulphur, Tire Brand, 99½% Pure
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- Carbon Tetrachloride
- Carbon Bisulphide
- Caustic Soda
- Sulphur Chloride
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Stauffer

CHEMICAL COMPANY

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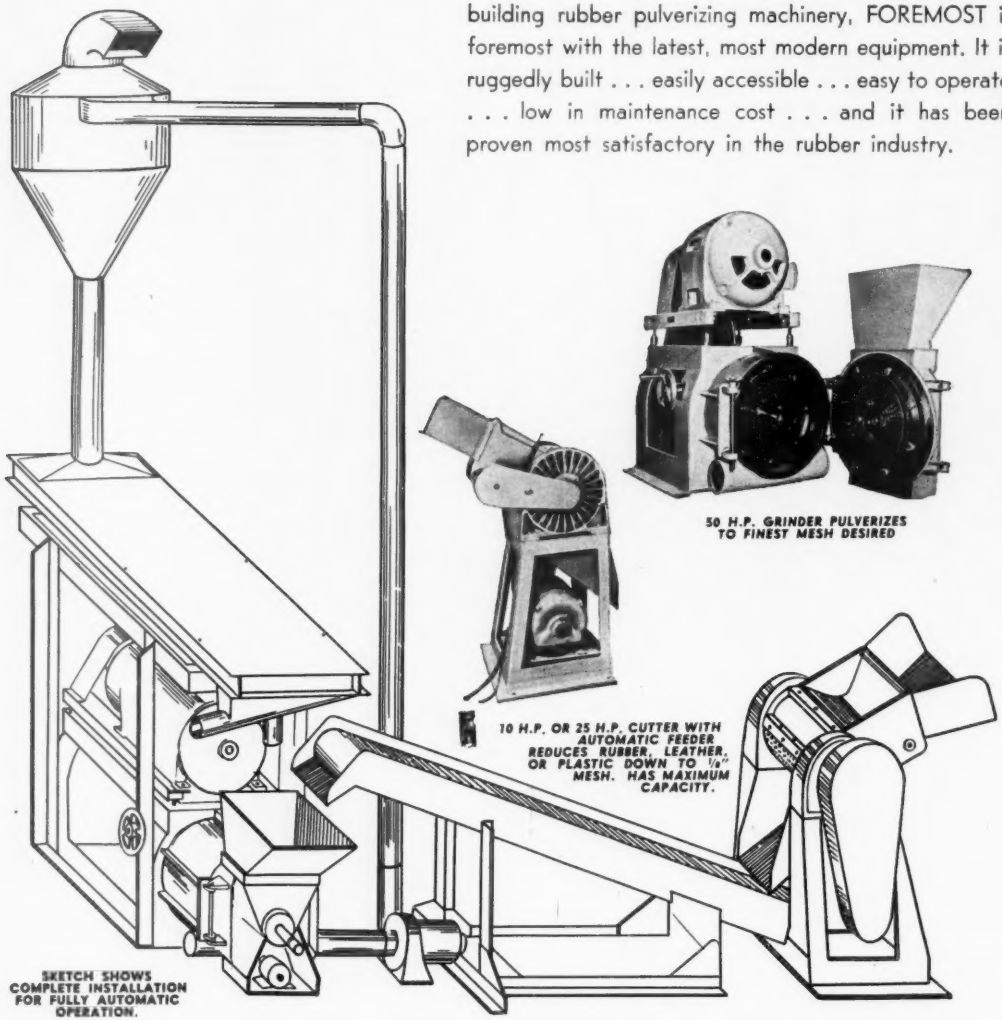
# FOREMOST makes the MOST of Rubber Waste

After over twenty years of experience in designing and building rubber pulverizing machinery, FOREMOST is foremost with the latest, most modern equipment. It is ruggedly built . . . easily accessible . . . easy to operate . . . low in maintenance cost . . . and it has been proven most satisfactory in the rubber industry.



50 H.P. GRINDER PULVERIZES TO FINEST MESH DESIRED

10 H.P. OR 25 H.P. CUTTER WITH AUTOMATIC FEEDER REDUCES RUBBER, LEATHER, OR PLASTIC DOWN TO 1/8" MESH. HAS MAXIMUM CAPACITY.

SKETCH SHOWS COMPLETE INSTALLATION FOR FULLY AUTOMATIC OPERATION.

## FOREMOST MACHINE BUILDERS, INC.

**82-31 51st Avenue Elmhurst, L. I., N. Y.**

*Can you profit by*

**BETTER SUSPENSION**

*in your products?*

If you produce paints, enamels, printing inks...or other mixtures, solutions and emulsions that have a tendency to settle out, you can profit by the excellent bodying and suspending properties of

**AERO* BRAND STEARATES**

AERO Brand Stearates are produced in modern equipment by a new process under continuous chemical control to meet exacting requirements for purity and uniformity. Available in exclusive multi-wall paper bags.

Write for descriptive booklets on AERO Brand Stearates and the advantages of bag packaging. *Trademark

*A Complete Line of Aero Brand Stearates*

Calcium • Aluminum • Zinc • Magnesium for

paints, lubricants, plastics, inks, rubber, cosmetics

*and many other uses*

AMERICAN Cyanamid COMPANY

INDUSTRIAL CHEMICALS DIVISION, Dept. H4

30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

# *found at last....*

## a **non-staining** antioxidant

# STABILITE WHITE*

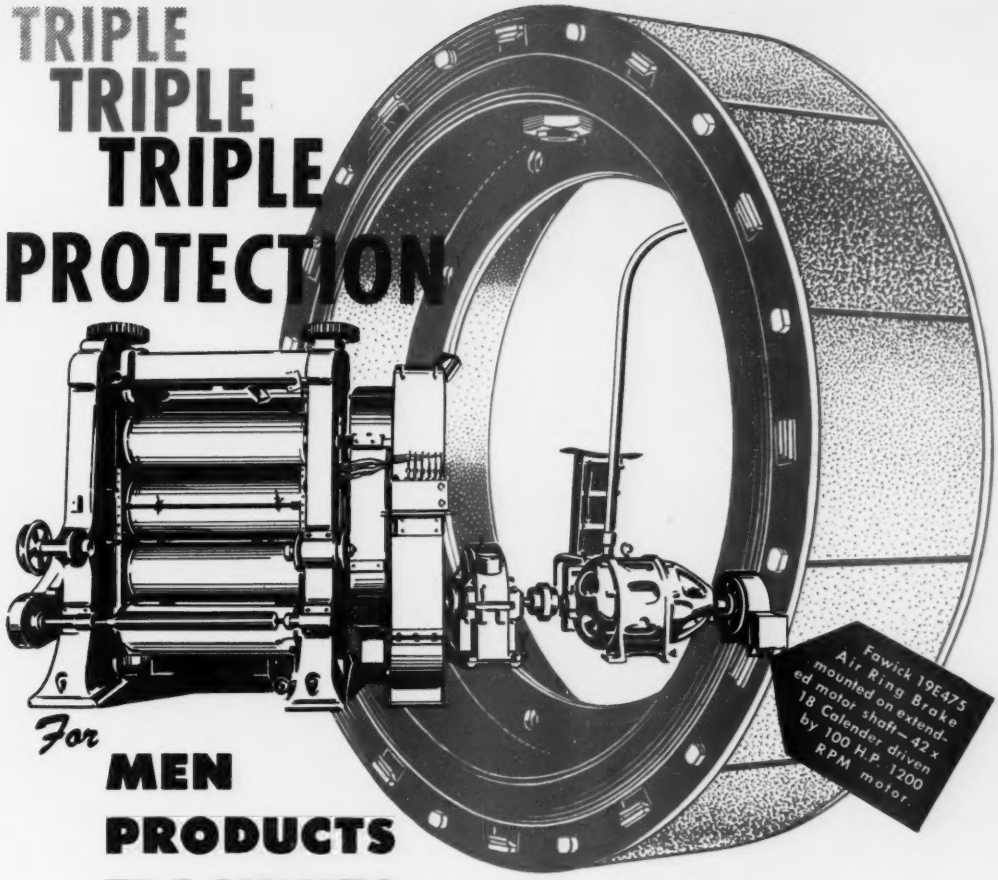
**STABILITE WHITE** is a mobile liquid NON STAINING antioxidant showing maximum age-resisting properties. It combines ease of handling and processing, sun-light and flex-check resistance and at the same time possesses the ultimate in non-staining characteristics. When these properties can be obtained with no increase in compounding costs, the far-seeing compounder will convert his recipes to include **STABILITE WHITE**. Try it in ***your*** compounds — crude rubber, synthetic or natural latex.

*MANUFACTURED BY CHEMICO, INC.
THE C. P. HALL CO. *Manufacturing Agents*

The C. P. Hall Co.
CHEMICAL MANUFACTURERS

**AKRON, OHIO • LOS ANGELES, CALIFORNIA • CHICAGO, ILLINOIS**

# TRIPLE TRIPLE TRIPLE PROTECTION




*For*

## MEN
## PRODUCTS
## MACHINES

The positive and efficient operation of Fawick Clutch and Brake units insures protection for men, products, and machines.

One, they protect workers by giving them sensitive and complete control of machine operation.

Two, they insure top-quality processing of material by their quick response and full effect in operation.

Three, they add years of top-efficiency operation by eliminating the damaging effects of inferior clutch or brake action.

Fawick design and operating features provide (1) even-pressure "constant velocity" contact on the full width of the friction surface; (2) rugged construction for heavy-duty applications; (3) complete range of torque control; (4) instant-acting remote control.

For complete technical information on Fawick Clutch and Brake Units, write to the Main Office, Cleveland, Ohio, for Bulletin 300.

ALL DESIRABLE CLUTCH CHARACTERISTICS ARE BUILT INTO FAWICK AIRFLEX UNITS

**FAWICK Airflex CO., INC.**
9919 CLINTON ROAD CLEVELAND 11, OHIO

**FAWICK CLUTCHES** = + + + = **PEAK EFFICIENCY**

AXIAL CONTACT · 360° RADIAL CONTACT · SHOCK ABSORPTION · CONTROLLED TORQUE

*Your Best Buy in*
*Today's High Market*
*for Natural Rubber Is*

# BUFFALO BLACK INNER TUBE RECLAIM

**While the cost of several grades of natural rubber has risen more than 5c during the past few months, our Black Inner Tube reclaims have come down in price and are now selling around 11½c per pound delivered your plant. This situation has created a splendid opportunity for rubber manufacturers to lessen compound and processing costs by substituting BUFFALO Inner Tube Reclaims, particularly for the lower grades of crude rubber . . . and yet maintain quality!**

**Our natural rubber Inner Tube Reclaims are made from carefully selected scrap, high in rubber content and low in specific gravity. They are excellent replacements for natural rubber in a great variety of rubber products.**

**Here are a few BLACK TUBE RECLAIMS containing only natural rubber:**

**R-650**—A soft, plastic tube reclaim made by our new "Dip Process" and especially suitable for sponge rubber, cements and extruded items.

**BLACK RANGER**—A tube reclaim of conventional type made by the digester process and recommended for electricians' tape, cements and molded products.

**7717**—A pan process tube reclaim suitable for extruded or molded jobs where fast cure and high tensiles are desired.

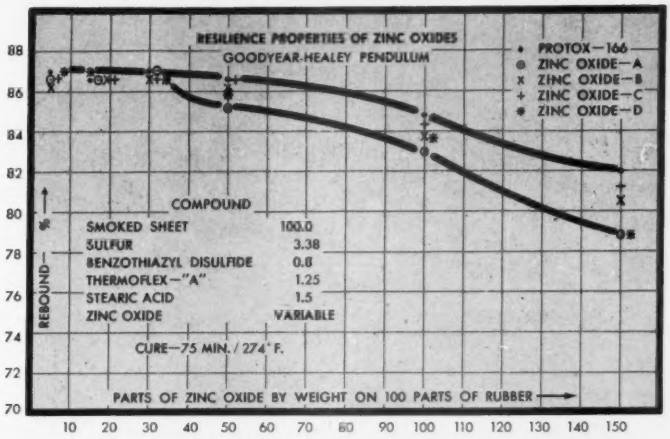
*Write today for samples and full information.*

**U. S. RUBBER RECLAIMING COMPANY, INC**
**P.O. BOX 365** **BUFFALO 5, N. Y.**
Trenton—H. M. Royal, Inc., 689 Pennington Ave.

*68 YEARS SERVING THE INDUSTRY SOLELY AS RECLAIMERS*

# In Your High Zinc Compounds ADD MORE PENDULUM REBOUND with PROTOX-166*

*(The Surface-Coated Zinc Oxide)*




**Protox-166** is outstanding among Zinc Oxides for its good rebound properties. The higher resilience it imparts to compounds is reflected in lower hysteresis loss, less heat generation, better performance and longer service life of rubber products.

**Protox-166** provides compounds with higher rebound than other oxides, primarily because its propionic acid treatment results in superior dispersion and internal lubrication. The higher the loading, the greater the resiliency advantage for **Protox-166** compared with a range of representative untreated Zinc Oxides, as shown in the chart. Even 150 parts of **Protox-166** on 100 parts of natural rubber provides a resilience within 5% of a "pure gum" compound.

*U. S. Patents 2,303,329 and 2,303,330

## PROTOX-166 GIVES YOU ALL THESE ADVANTAGES

COMPARED WITH OTHER ZINC OXIDES

**LESS MOISTURE PICKUP**

**LOWER DRY BULKING**

**SPEEDS MIXING**
- Permits larger master batches
- Faster incorporation
- Better dispersion
- Lower power consumption

**INHIBITS SCORCH**

**IMPROVES TUBING AND CALENDERING**
- Provides plasticizing effect
- Imparts smoother tubing
- Reduces die swell
- Cuts calender shrinkage
- Gives cooler running stocks

**HELPS REINFORCEMENT**
- Improves tensiles
- Raises tear resistance
- Increases modulus
- Steps up resilience

For further details, see "The Activator," Vol. 9, No. 1.

**If you are not yet using Protox-166, may we send you samples?**

HORSE HEAD PRODUCTS

**THE NEW JERSEY ZINC COMPANY**

**160 FRONT STREET • NEW YORK 7, N. Y.**

# NATURAL and SYNTHETIC RUBBER LATEX and LATEX COMPOUNDS

**Available as Prevulcanized, Vulcanizable, or Unvulcanized**

We supply natural and synthetic rubber latex and latex compounds for hundreds of products in over twenty industries. If you are bonding, coating, impregnating, saturating, extruding, flocking, molding, casting, or dipping, we can offer you industrially proven compounds. For new and special purposes we are prepared to develop new compounds.

**General Latex & Chemical Corp.**
666 Main Street, Cambridge, Massachusetts
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Verdun Industrial Building, Verdun, Montreal, Quebec

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**INDUSTRIAL ADHESIVES**
Aluminum Foil
Bandage
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Combining Fabrics
Cork
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Fiber Bat
Flocking
Library Paste
Masking Tape
Paper
Pressure Sensitive Tape

**SHOE ADHESIVES**
Foxing
Heel Cover
Sole Attaching
Sole Laying

**IMPREGNATION**
Box Toes
Curled Hair
Fabric
Flame Proofing
Napped Fabrics
Paper
Rug Sizing
Rug Underlays
Thread
Tire Cord

**COATINGS**
Bath Mats
Canvas Gloves
Felt
Fishermens' Garments
Metal
Occupational Clothing
Paper
Pile Sealing
Raincoats
Sheeting
Tank
Wire Goods

**DIPPED GOODS**
Baby Pants
Balloons
Bathing Caps
Bladders (Football, Soccer, Basketball)
Diaphragms
Finger Cots
Footwear
Household Gloves
Ink Sacs
Nipples
Prophylactics
Sheeting
Surgeon's Gloves
Toy Balloon Outfits
Toys

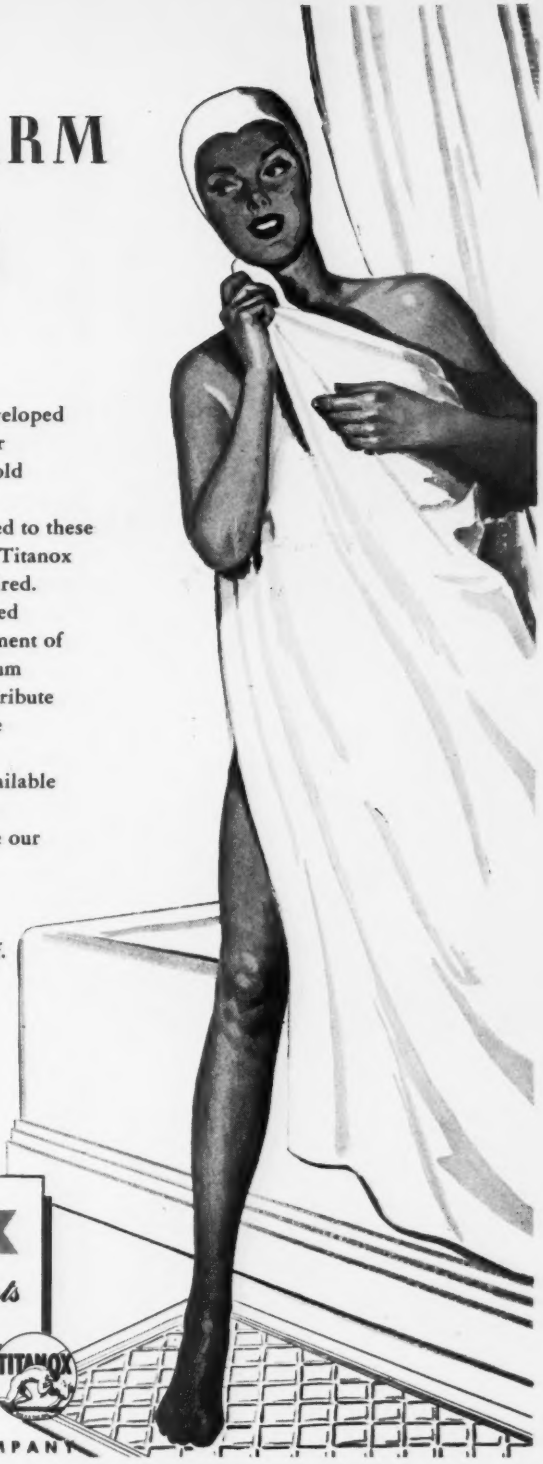
**MISCELLANEOUS**
Allergy Pillow and Mattress Paint
Casting and Molding
Chewing Gum
Flexible Molds
Flooring
Mannequins
Rubber Dolls
Advertising Novelties

# *Bright* WARM and MODERN

MODERN rubber technology has recently developed a warm suede-like finish for rubber shower curtains and bathmats that banishes forever the cold clammy clasp of wet rubber.

Outstanding brightness and opacity are imparted to these products—like so many other modern articles by Titanox pigments, whether whiteness or soft tints are desired. For the more heavily loaded stocks such as are used in bathmats, TITANOX-RCHT is the titanium pigment of choice. All Titanox pigments whether pure titanium dioxide or titanium dioxide-calcium sulphate contribute superior pigment properties economically and are compatible with all types of rubber.

Our Technical Service Department is always available for consultations on your pigmentation problems with all kinds of rubber products. Write or phone our nearest office. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; 104 South Michigan Avenue, Chicago 3, Ill.; 2600 South Eastern Avenue, Los Angeles 22, Calif. Branches in all other principal cities.



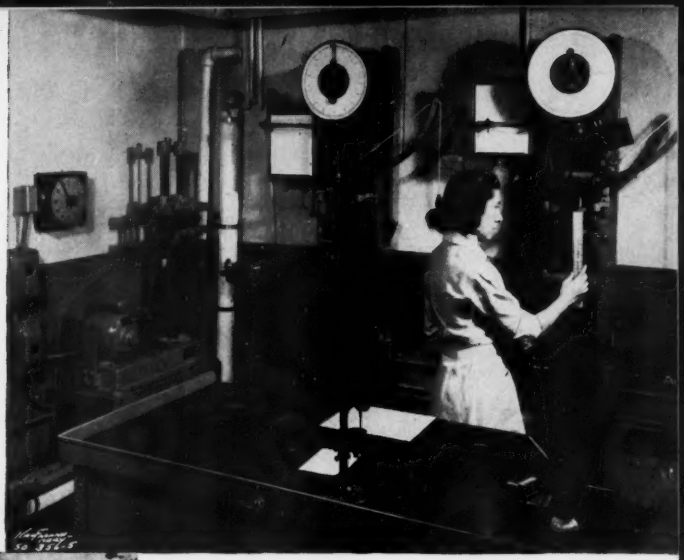
8219

® TITANOX

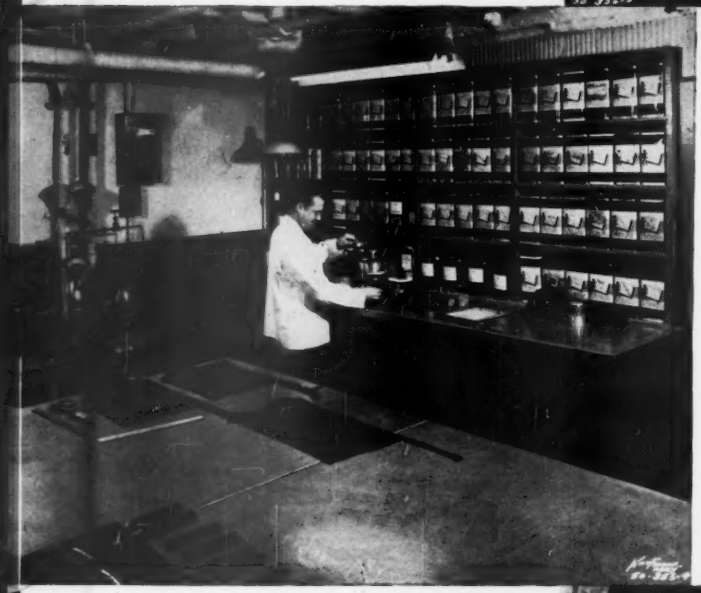
*the brightest name in pigments*

TITANIUM PIGMENT CORPORATION

*Subsidiary of* NATIONAL LEAD COMPANY



*One section of constant controlled temperature-humidity testing room showing Scott testers and flexing machine.*



*Compounding section where rubber test batches are prepared for mill and Banbury mixing.*

*Compounding test batches to determine the properties of Witco-Continental Carbon Blacks in natural and chemical rubbers.*

*Hydraulic curing presses for vulcanization of test samples. Size "B" Banbury pictured at left.*

*Part of Witco-Continental's new rubber laboratory showing mill and other specialized testing equipment.*

# New enlarged WITCO-CONTINENTAL rubber technical service laboratory

## ...now ready to help solve your technical problems

Witco Chemical Company and Continental Carbon Company announce the opening of their combined and enlarged new RUBBER TECHNICAL SERVICE LABORATORY, at 6200 West 51st Street, Chicago.

This new laboratory is completely equipped with the most modern processing and testing equipment. It is now ready to assist in solving *any* technical problem involving Continental or Witco Carbon Blacks or other Witco products used in rubber manufacturing.

We will be very pleased to show you around these new quarters and hope that we will have a visit from you soon.

**WITCO CHEMICAL COMPANY**

CONTINENTAL CARBON COMPANY

295 MADISON AVENUE, NEW YORK 17, N. Y.

Akron, Amarillo, Boston, Chicago, Detroit, Cleveland, Los Angeles, San Francisco, London and Manchester, England

# *Indispensable* TO YOU IN THE RUBBER INDUSTRY—

## *Gives Your Products*

## PROTECTION and SALES APPEAL

### *at Little Cost!*

**BEACOFINISH**—a unique family of coating materials conceived to give your products greater durability and eye appeal. These highly concentrated wax emulsions that can be diluted with up to four parts of water can be used with the utmost safety and economy.

**BEACOFINISH** is therefore of four-fold importance to you:—

1. ***It Protects*** your products against their natural enemies—air, sunlight, moisture and excessive handling.
2. ***It Improves*** the appearance of your product for its uniform coating stimulates greater consumer interest.
3. ***It's Economical*** because its high dilution potential (without losing efficiency) allows one gallon to cover 15,000 sq. ft.
4. ***It's Safe*** being a wax in water emulsion, it eliminates the fire and health hazards of volatile-solvent based finishes.

**BEACOFINISH** can be applied by dipping, sponging, spraying or brushing—dries in about 20 minutes—faster if force-dried—to give a hard protective coating of great elasticity.

**BEACOFINISH** may be ordered in Neutral or Black, in varying degrees of luster from brilliant to dull. It is so concentrated, from one drum you can obtain potentially up to five drums of superior coating for your products.

**CONSULT US—WRITE US TODAY**

**Let us show you how BEACOFINISH can make your products more attractive and saleable—protect them from damage—you from loss—in production and transit!**

THE BEACON COMPANY
*Chemical Manufacturers*
97 BICKFORD STREET
BOSTON 30 MASSACHUSETTS

In Canada: PRESCOTT & CO., Reg'd.
774 St. PAUL ST. W. MONTREAL

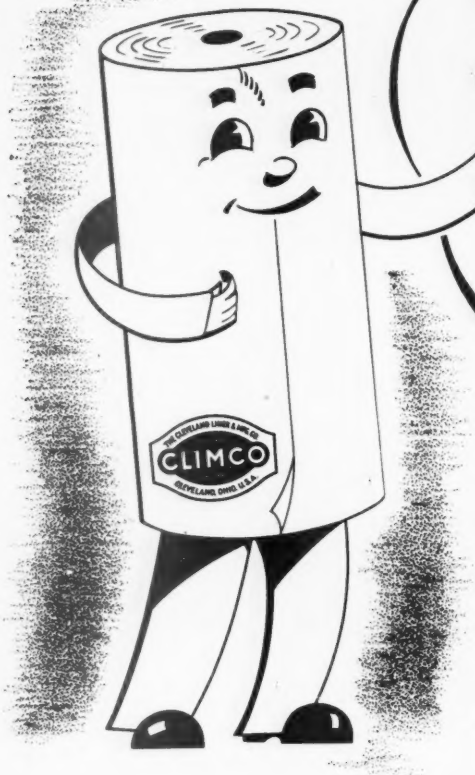
*for bulk shipment too!*

GODFREY L. CABOT INC.

77 FRANKLIN STREET, BOSTON 10, MASSACHUSETTS

MR. CLIMCO SAYS.....

# "CLIMCO LINERS separate perfectly from the stock"




Stock adhesions at any point in production mean time lost and extra expense. You can avoid such headaches by using Climco Processed liners that can be readily peeled from the stock without sticking.

Climco Processing of your liners assures many other profitable advantages: Liner life is greatly increased, tackiness of the stock is preserved, and gauges are more easily maintained. Latitude in compounding is enlarged, lint and ravelings are eliminated and horizontal storage is facilitated.

Since 1922 Climco Processed Liners have proved their worth to the rubber industry. Give them a trial in your plant.

**THE CLEVELAND LINER & MFG. CO.**
**5508 Maurice Avenue • Cleveland 4, Ohio, U. S. A.**
*Cable Address:* **"BLUELINER"**

**ILLUSTRATED LINER BOOKLET**

Tells all about Climco Liners and Linerette and how to get better service from liners. Write for your copy now.

**LINERETTE INTERLEAVING PAPER**
*Treatment Contains*
**NO OIL OR WAX**
*Samples on Request*

# CLIMCO
## PROCESSED LINERS

*Serving the Rubber Industry for 26 Years*

CLIMCO
CLEVELAND, OHIO U.S.A.

CLIMCO
CLEVELAND, OHIO U.S.A.

# How Can You Benefit From This Versatile Catalyst? $BF_3$

# Boron Fluoride

**ETHER COMPLEX, PHENOL COMPLEX OR COMPRESSED GAS**

**UNUSUALLY VERSATILE** Boron Fluoride offers important advantages for a wide range of reactions. Some of these are listed at right. Such benefits merit thorough investigation in any operation where the catalytic properties of $BF_3$ can be utilized. They may mean increased economy and efficiency in your process too! Further information helpful in evaluating $BF_3$ for your needs is available from any B&A office.

**AS A PIONEER** in the field of fluorine compounds, Baker & Adamson introduced $BF_3$ Etherate to industry a number of years ago. Today it also offers the Compressed Gas and Phenol Complex in commercial quantities. In addition, extensive production and research facilities place B&A in a preferred position to work with you in development of other $BF_3$ complexes to meet individual specifications.

**SOME ADVANTAGES $BF_3$ OFFERS IN PROCESS USE:**

- Operating temperature ranges are wider.
- Yields are increased.
- Separations are easier and no bulky sludges are formed.
- Properties of end-products are improved.
- More reactions are carried to completion.
- Fewer undesirable waste materials result.
- Smaller quantities have greater catalytic activity.
- Little or no extraneous material is introduced into the system.
- Reactions are moderated or more easily controlled.

**USES OF BORON FLUORIDE AS A CATALYST**

1. Polymerization and co-polymerization of mixed unsaturates.
2. Selective esterification of mixtures of organic acids.
3. Cyclization of synthetic and natural elastomers after polymerization or in starting from monomers.
4. Condensation of modified phenolics.
5. Preparation of alkyl phenols.
6. Refining of aromatic and paraffinic solvents by polymerization of the olefins they contain.
7. Modification of mixtures of esters and acids by polymerizing conjugated compounds selectively.

REAGENTS B&A STANDARD OF PURITY FINE CHEMICALS

## BAKER & ADAMSON *Fine Chemicals*

**GENERAL CHEMICAL DIVISION**
ALLIED CHEMICAL & DYE CORPORATION

40 RECTOR STREET, NEW YORK 6, N. Y.

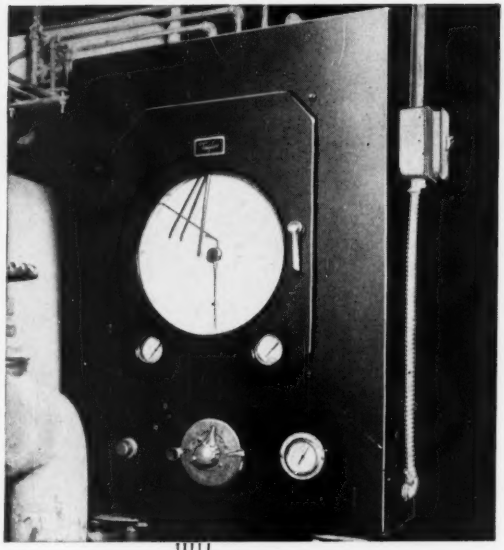
*Offices:* Albany* • Atlanta • Baltimore • Birmingham* • Boston* • Bridgeport* • Buffalo* • Charlotte* Chicago* • Cleveland* • Denver* • Detroit* • Houston* • Los Angeles* • Minneapolis • New York* Philadelphia* • Pittsburgh* • Portland (Ore.) • Providence* • St. Louis* • San Francisco* • Seattle Wenatchee (Wash.) • Yakima (Wash.)
In Wisconsin: General Chemical Company, Inc., Milwaukee, Wis.
In Canada: The Nichols Chemical Company, Limited • Montreal* • Toronto* • Vancouver*

SETTING THE PACE IN CHEMICAL PURITY SINCE 1882

* Complete stocks are carried here.

# GOOD CONTROL

## can come in small "packages"



YES, you can now order a "package" of Taylor Accuracy. A complete Taylor Coordinated Control System in one small compact unit that will deliver uniform cures at lowest cost.

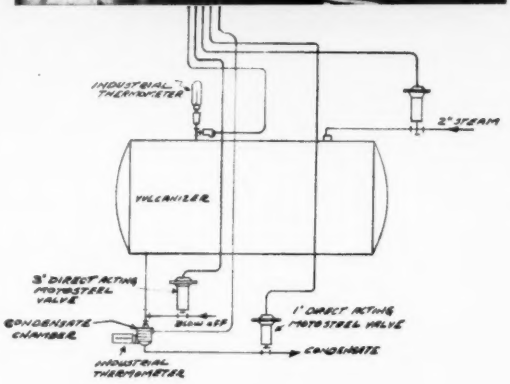
For instance, this Taylor Packaged Unit with Double-Duty Process Timer is running a big mechanical rubber goods vulcanizer. All the operator has to do is load his vulcanizer and set the cure time. Then Taylor Control takes over with an automatically coordinated system of time and temperature—faithfully repeating each cycle again and again. Not long ago the Goodyear Tire and Rubber Company installed several of these units, and they report:

**Production Increased** through increased efficiency . . . fewer rejects.

**Costs cut greatly** through steam savings.

**Manpower saved** because operators are released for other duties, and *from* all responsibility for efficiency processing.

The instrumentation in every package is designed from the start to work together. You have the economy and dependability of air-operated control. And you have a complete control system in one neat package . . . good housekeeping for your plant and easy maintenance for your men.




Ask your Taylor Field Engineer! He'll analyze your problem, then turn the job over to Taylor Application Engineers—specialists in instrumentation. Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada. *Instruments for indicating, recording and controlling temperature, pressure, humidity, flow and liquid level.*

*Taylor Instruments*

*MEAN*

***ACCURACY FIRST***

IN HOME AND INDUSTRY

# STOP RISING COSTS

**WITH**

# Piccolyte

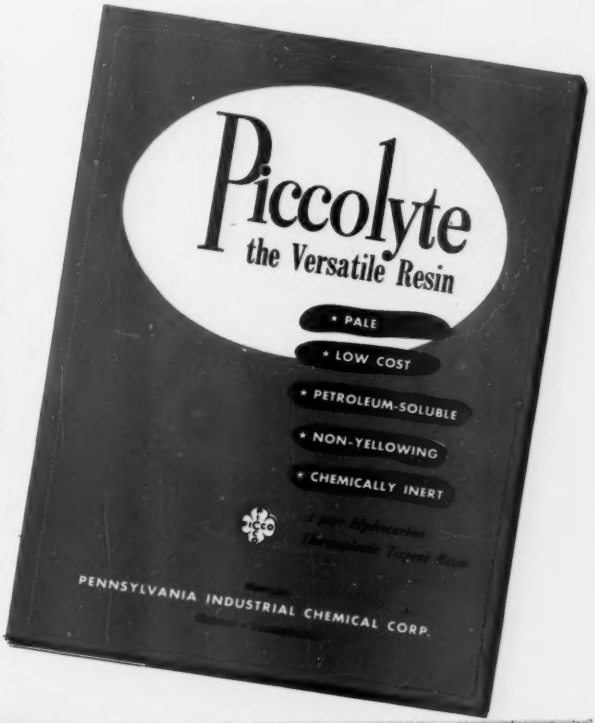
the Versatile Resin

## *Costs Less... Offers More!*

Piccolyte—a pure hydrocarbon, thermoplastic terpene resin—is low in cost and readily soluble in low-cost naphthas, pentane and hexane. It is pale and stable in color, chemically inert, compatible with many other materials, non-toxic. There are nine melting points.

Piccolyte has the same carbon to hydrogen ratio as plantation rubber, and has excellent tack-producing properties. Ideal for rubber tile and other products where light colors and tints are demanded.

Use Piccolyte to keep your costs down without sacrificing in any way the quality of your products. Piccolyte costs less per pound today than practically all other resins, yet offers the maximum in quality and service.




***Did you get your copy?***

Write for this data booklet, and a free sample of PICCOLYTE. Give intended use, so we can send sample of appropriate grade.

**PENNSYLVANIA**
**INDUSTRIAL CHEMICAL CORP.**
CLAIRTON, PENNA.

Makers of Coumarone Resins • Coal Tar Solvents • Styrene Resins • Rubber Plasticizers • Reclaiming Oils • Terpene Resins • High Solvency Naphthas • Solvent Oils

Plants at Clairton, Pa. and Chester, Pa.

Distributed by
Harwick Standard Chemical Co., Akron 8, Ohio

Pennsylvania Industrial Chemical Corp.
Clairton, Pennsylvania

Please send me a free sample of Piccolyte, and your new bulletin. I wish to investigate Piccolyte for (application).....

Name.....

Company.....

Address.....

(RA)

*Chemicals you live by*

# NATURE IS SELDOM UNIFORM

Even the best natural raw materials vary in quality when compared with standards set by *chemically produced* materials. That's one reason for the popularity of plastics . . . and an important consideration when specifying vinyl extenders.

Your vinyl formula calls for resins, plasticizers and stabilizers that have controlled uniform quality because they are *chemically produced*. The same standards should, and can, apply to the extender you use.

Because DIAMOND's Precipitated Calcium Carbonates are *chemically produced* they provide a vinyl extender of controlled purity and outstanding uniformity.

To guarantee the day-to-day uniformity of your vinyl compounds, it will pay to specify one of DIAMOND ALKALI's eight grades of Precipitated Calcium Carbonate. This line of vinyl extenders gives you a wide selection of particle size and other physical and chemical properties. And DIAMOND's Technical Service Staff is available to help you select the extender best suited to your requirements. Just call your nearest DIAMOND Sales Office, or write us direct.

**DIAMOND PRECIPITATED CALCIUM CARBONATES:** Multifex* • Super Multifex* • Multifex MM* • Kalite* • Millical* • Suspenso • Non-Fer-Al* • Surfex*

**WRITE FOR OUR BULLETIN, *"Dispersing Calcium Carbonates in Vinyl Plastics".***

*®

**DIAMOND SALES OFFICES:** Boston, New York, Philadelphia, Pittsburgh, Cleveland, Cincinnati, Chicago, St. Louis, Memphis, Houston.

**DIAMOND DISTRIBUTORS:** C. L. Duncan Co., San Francisco and Los Angeles; Van Waters and Rogers, Inc., Seattle and Portland, U.S.A.; Harrisons and Crosfield, Dominion of Canada.

**DIAMOND CALCIUM CARBONATES**

DIAMOND ALKALI COMPANY . . . CLEVELAND 14, OHIO

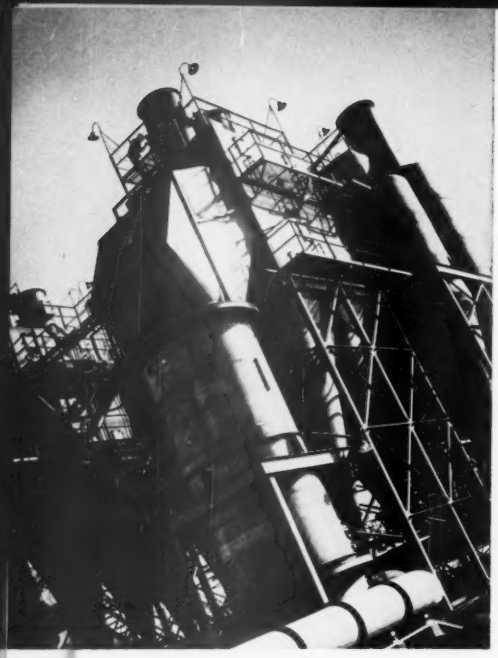
DIAMOND ALKALI CHEMICALS

# CARBON BLACKS

**UNITED CARBON COMPANY, INC.**

CHARLESTON 27, W. VA.

NEW YORK • AKRON • CHICAGO • BOSTON



Close-up of coolers, precipitators, and cyclone collectors in one of the several units of our furnace black plant at Ryus, Kansas.

# DIXIE 40

## *It is . . .*

A furnace black — HMF type.

Made from natural gas.

Well balanced in physical and chemical properties.

Always uniform in quality.

Highly reinforcing.

Easy-mixing, quick-tubing, tight-curing.

## *It is Used . . .*

In tire treads and inner tubes.

In sidewalls and carcass stocks.

In mechanical goods.

Alone or blended with other United blacks.

And adapted for wide applications.

## *It is available . . .*

For immediate shipment.

To meet your specifications.

In pelleted, dustless form.

Clearly branded.

Coded to your wish.

In 25lb or 50lb bags.

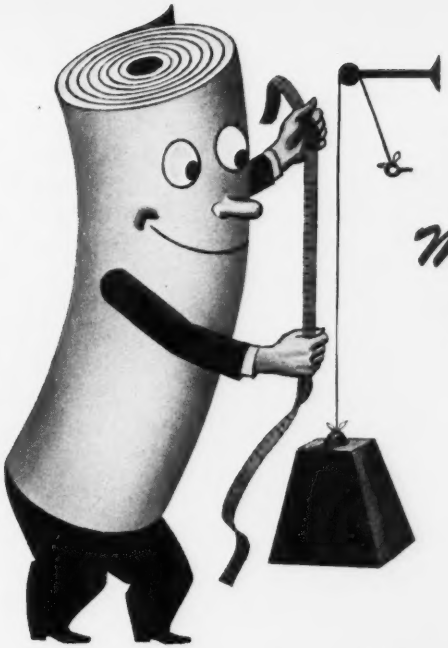
In bulk in closed hopper cars.

*AND Dixie 40 will put your products in a high quality range. Standardize on Dixie 40.*

RESEARCH DIVISION

**UNITED CARBON COMPANY, INC.**

Charleston 27, West Virginia

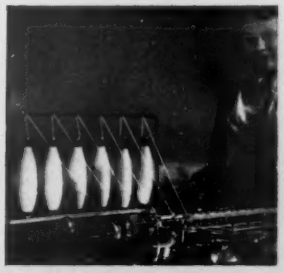


# UNIFORMITY

## *Makes the Big Difference*

## In INDUSTRIAL Fabrics

**TESTING STRENGTH AND ELONGATION OF YARN WITH MOSCROP TESTER.** This unit automatically tests 6 strands of yarn at one time. One of a series of comprehensive laboratory controls throughout production to assure fabric uniformity in all Mt. Vernon-Woodberry products.



MT. VERNON — WOODBERRY FABRICS

*Gives You*

**Greater Fabric Uniformity**

The greater uniformity of Mt. Vernon fabrics means *consistent* quality in your finished products — smoother, more efficient fabrication.

**AT YOUR SERVICE**

Mt. Vernon-Woodberry's staff of textile engineers is available on request to help you with your problems in development or application of industrial fabrics.

*Mt. Vernon-Woodberry* **Mills**

**Branch Offices: Chicago • Atlanta • Baltimore • Boston • Los Angeles**

**TURNER HALSEY COMPANY**
*Selling Agents*
40 WORTH ST NEW YORK

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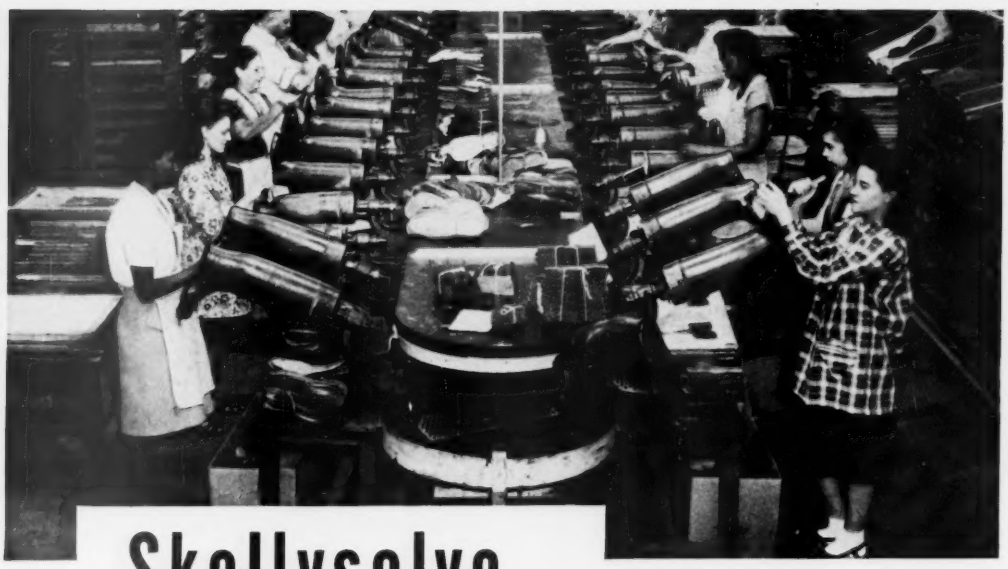

# Skellysolve

## "DIGS IN" at the production line...

**to help you make BETTER SHOES and BOOTS**

**to help you SELL MORE OF THEM!**

**"DOC" MacGEE SAYS:** You benefit *twice* when you use SKELLYSOLVE in your footwear and other rubber manufacturing operations. Because Skellysolve has *more* desirable solvent qualities, it helps you produce better products easier and at lower cost... and better *products* make your *selling* job easier!

**Here are the superior Skellysolve qualities you can take advantage of TODAY:**

★ Minimum of greasy residues, high boilers, and pyrogenic decomposition products, giving quick drying and high tensile strength.

★ Sweet odor and low toxicity, to reduce health hazards.

★ Fewer unsaturates and impurities, resulting in less thinning or gelling tendencies.

★ Low vapor pressures to end "bloating" of tubes or cans. Helps to reduce blistering.

★ Dependable supply, to assure uninterrupted production.

★ Minimum of excessive volatiles, reducing tendency to seed and blush.

***TODAY... WRITE FOR PRICES AND DETAILED INFORMATION***

SKELLY

# Skellysolve

**SOLVENTS DIVISION, SKELLY OIL COMPANY, KANSAS CITY, MO.**

better
rubber
means better
rubber
products
...specify

## No. 1 Ribbed Smoked Sheets—plus* for highest quality inner tubes

No. 1 Ribbed Smoked Sheets—Plus is the improved rubber containing PEPTON® 22, the remarkable plasticizer that can be added to latex at the plantation or in the mill. With PEPTON 22 you get

at least 50% reduction in breakdown time
lower power consumption
better processing qualities
—with no effect on the physical
or aging characteristics of the rubber.

Put quality into inner tubes and other rubber products by specifying

**No. 1 Ribbed Smoked Sheets—plus**
(product of European owned estates)
*Contains ½% Pepton 22

AMERICAN Cyanamid COMPANY
CALCO CHEMICAL DIVISION
INTERMEDIATE & RUBBER CHEMICALS DEPARTMENT
BOUND BROOK, NEW JERSEY, U. S. A.

Calco

SALES REPRESENTATIVES AND WAREHOUSE STOCKS: Akron Chemical Company, Akron, Ohio • Ernest Jacoby and Company, Boston, Mass. • Herron & Meyer of Chicago, Chicago, Ill. • H. M. Royal, Inc., Los Angeles, Calif. • H. M. Royal, Inc., Trenton, N. J. • In Canada: St. Lawrence Chemical Company, Ltd., Montreal and Toronto

# Do your rubber products say "Come hither"?

## Use Du Pont "Alamask" odorants
TRADE-MARK

Nobody wants to buy a product with an unpleasant odor! But now—with Du Pont "Alamask" odorants—both your natural, neoprene and other synthetic rubber products can have a clean and pleasing odor. Unpleasant odors can be neutralized throughout.

Du Pont odor chemists, working with rubber technologists, have developed a series of "Alamask" odorants. These carefully tested odorants neutralize off-odors or give a pleasant scent, whichever you desire. You'll use them successfully on Latex, bonded fibers, adhesives, dipped goods, blown sponge and many other rubber products. There is no significant effect on processing characteristics or rate of cure.

## Du Pont "Alamask" odorants
TRADE-MARK

**Du Pont laboratory skill is at your service.** Send for the booklet "Odorants for the Rubber Industry"—or ask us for specific recommendations for your individual problems. Write—E. I. du Pont de Nemours & Co. (Inc.), Organic Chemicals Department, Aromatics Section, Wilmington 98, Delaware. Branch Offices: Atlanta, Boston, Charlotte, Chicago, New York, Philadelphia, Providence, San Francisco.

DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

# Rubber Producers Take Note:

## 1950 - 1840 - 110 YEARS PRODUCING FATTY ACIDS FOR INDUSTRY!

## YOUR ASSURANCE OF... CONTINUITY, DEPENDABILITY, AT FAIR PRICES

Here, at your service, is over a century of experience in producing fatty acids. It's the kind of background you want, to be sure of getting the right product at a fair price, 100% of the time!

Modern Processing methods exclusive with Emery provide unique product advantages. You can rely on continuing research to develop new and better products. You can depend on thorough analysis, exact adherence to specifications on every shipment. You can count on reliable and uniform performance when you buy Emery products:

5 grades of *Stearic Acid* varying in composition and physical characteristics.

7 high-stability *Oleic Acids* with lowest unsaponifiable content . . . Emersol 233 LL Elaine is the purest oleic acid available commercially.

*Vegetable Fatty Acids*—cottonseed, soya, coconut. *Hydrogenated Fatty Acids. Glycerides.*

Contact us or our representatives to find out how Emery can help you select the right fatty acid.

**EMERY** WORLD'S LARGEST PRODUCER OF FATTY ACIDS

**EMERY INDUSTRIES, INC., 4206 CAREW TOWER, CINCINNATI 2, OHIO**

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SCHIBLEY & OSSMANN, 33 Public Square, Cleveland 13 • ECCLESTONE CHEMICAL CO., 2673 Guoin, Detroit 7

# When you need TEAR resistance.... remember Marbon "8000"

In GR-S Compounds requiring high tear resistance MARBON "8000" does an outstanding job in either Black or Non-Black stocks. Remember MARBON "8000" for high tear resistance in oil-resistant Compounds, either Black or Non-Black.

**Remember MARBON "8000" for:**

1. **Elimination of prior Masterbatching.**
2. **Plasticizing action at processing temperatures.**
3. **Higher unit reinforcement.**
4. **Lower power consumption on highly loaded stocks.**
5. **Versatility with natural, synthetic and reclaim rubbers.**

For Technical Service and samples write:

**MARBON CORPORATION**
**GARY INDIANA**

## DC 1107 SILICONE

# "abhesive"

## KEEPS RUBBER, ASPHALT AND PRESSURE SENSITIVE TAPES FROM STICKING TO PAPER!

We've coined a word to describe the remarkable release characteristic imparted to paper by DC 1107. This invisible silicone coating developed by Dow Corning makes paper completely "abhesive" to materials like uncured natural and synthetic rubber stocks, asphalt and adhesive tapes that normally stick to any surface.

In the rubber industry, DC 1107 treated paper is proving its usefulness as a low-cost, heat-stable interleaving material. It gives fast, clean release with no pick-off onto uncured stocks. It also preserves the high surface finish of cured parts—and it's highly water-repellent.

Photo Courtesy Baldwin Rubber Co.

Development engineers and production men at Baldwin Rubber Company of Pontiac, Michigan, have already found two good uses for the DC 1107 Silicone treated Kraft paper made by Central Paper Company. They use it wherever sticking is a problem in piles of raw shoe sole stock. It is also used to preserve the high surface shine of finished shoe sole sheeting taken from the press at temperatures above 300°F. and piled on leaf-trucks. Cost is substantially below that of conventional interleaving cloth.

***For stability, fast, clean release, high surface finish and lower production*** **costs in interleaving sheets, try DC 1107 SILICONE TREATED PAPER.**

Photo Courtesy Baldwin Rubber Co.

***For stability, fast, clean release, high surface finish and lower production*** **costs in forming and molding tires and rubber goods specify**

**DC MOLD RELEASE EMULSION NO. 35A**

**DC MOLD RELEASE EMULSION NO. 35**

**DC MOLD RELEASE FLUID**

For more information on DC Silicone Mold Release agents, call our nearest branch office or write for data sheet M-15.

**NOW AVAILABLE**

- FOR INTERLEAVING UNCURED STOCKS OR SEPARATING CURED SHEETS WHERE SURFACE FINISH IS IMPORTANT.
- AS BACKING FOR CALENDERED STOCK, CAMELBACK, TIRE TUBE PATCHES.
- FOR INTERLEAVING PRESSURE SENSITIVE TAPE.

Photo Courtesy Central Paper Co.

Sample sheets of DC 1107 treated paper for developmental use, are available from Central Paper Company, Muskegon, Michigan. For more information on DC 1107 treated paper write Dept. 7-3.

**DOW CORNING CORPORATION**
**MIDLAND, MICHIGAN**

Atlanta • Chicago • Cleveland • Dallas • Los Angeles • New York
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Dow Corning
FIRST IN SILICONES

# PROTECT

## your vinyl plastics AGAINST BOTH LIGHT AND HEAT ...with these "Dutch Boy" Stabilizers

### "DUTCH BOY" DYPHOS

***Dibasic Lead Phosphite.*** The outstanding heat and light stabilizer for vinyl chloride polymers and copolymers. Dyphos is unexcelled in providing protection against the deleterious effects of *both* heat and light.

The remarkable effectiveness of Dyphos makes it possible to utilize chloroparaffins as low cost flame-resistant secondary plasticizers in quality products. Dyphos is also highly effective in plastisols and organosols.

| TRADE NAME | CHEMICAL COMPOSITION | RECOMMENDED FOR USE IN |
|---|---|---|
| "Dutch Boy" Tribase | Tribasic Lead Sulphate | Electrical compounds |
| "Dutch Boy" Tribase E | Basic Lead Silicate Sulphate Complex | Low volume cost insulation |
| "Dutch Boy" DS-207 | Dibasic Lead Stearate | Sheeting, extrusion and molded compounds, i.e., insulated wire and vinyl phonograph records |
| "Dutch Boy" Plumb-O-Sil A | Coprecipitate of Lead Orthosilicate and Silica Gel | Translucent and colored sheeting and upholstery stocks |
| "Dutch Boy" Plumb-O-Sil B | Coprecipitate of Lead Orthosilicate and Silica Gel | Translucent film and sheeting, belting |
| "Dutch Boy" Plumb-O-Sil B Electrical Grade | Coprecipitate of lead Orthosilicate and Silica Gel | Highgrade insulated wire and sheeting |
| "Dutch Boy" Dythal | Dibasic Lead Phthalate | General purpose stabilizer for heat and light |
| "Dutch Boy" Dyphos | Dibasic Lead Phosphite | Excellent for heat and light in all opaque stocks including Plastisols and Organosols |
| "Dutch Boy" Normasal | Normal Lead Salicylate | Vinyl flooring compounds. Rubber stocks as non-scorch activator |

### "DUTCH BOY" TRIBASE

***Tribasic Lead Sulphate plus***

### "DUTCH BOY" DS-207

***Dibasic Lead Stearate***

The popular combination for good, all-around performance. Combines heat stability, light fastness and lubricity in processing.

### "DUTCH BOY" DYTHAL

***Dibasic Lead Phthalate.*** An excellent absorber of ultra-violet light, Dythal promotes light fastness in organic films. This advantage, combined with rugged heat stability derived from the basic character of this compound, makes Dythal the *general purpose stabilizer.*

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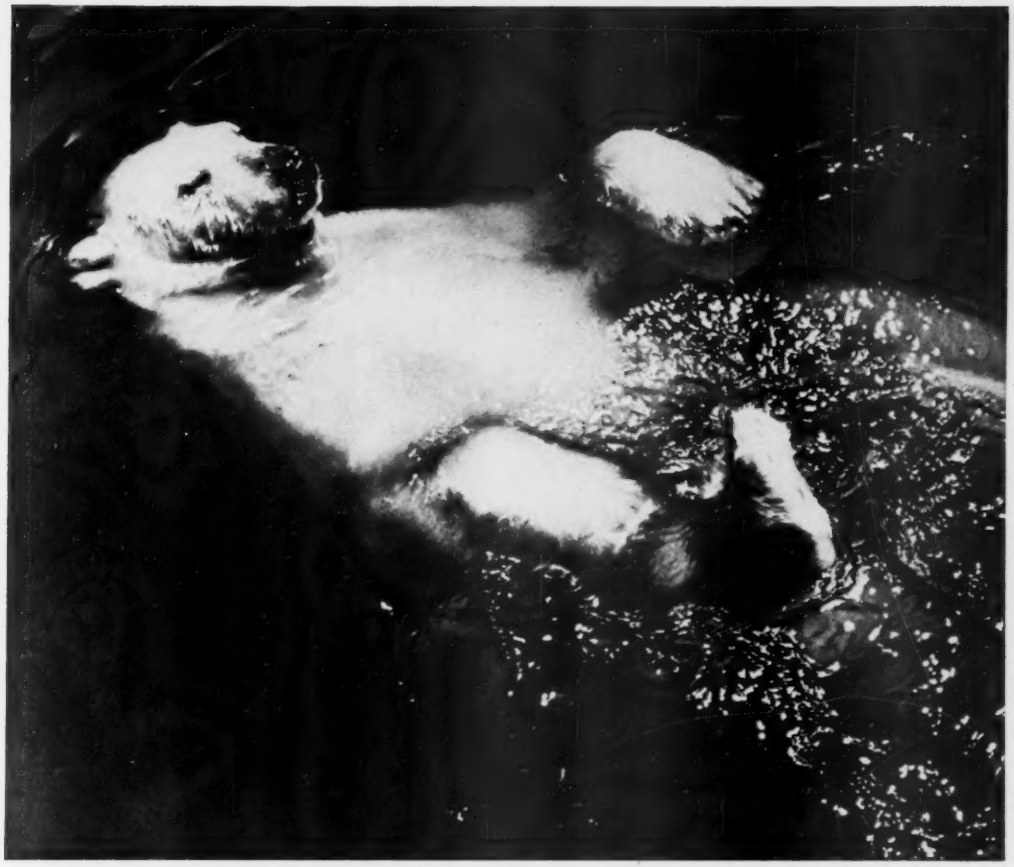

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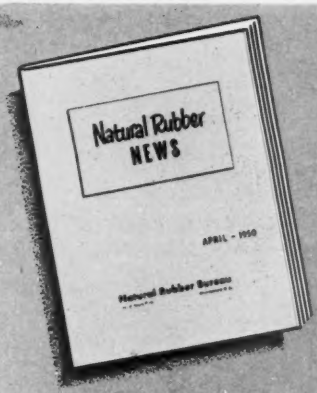


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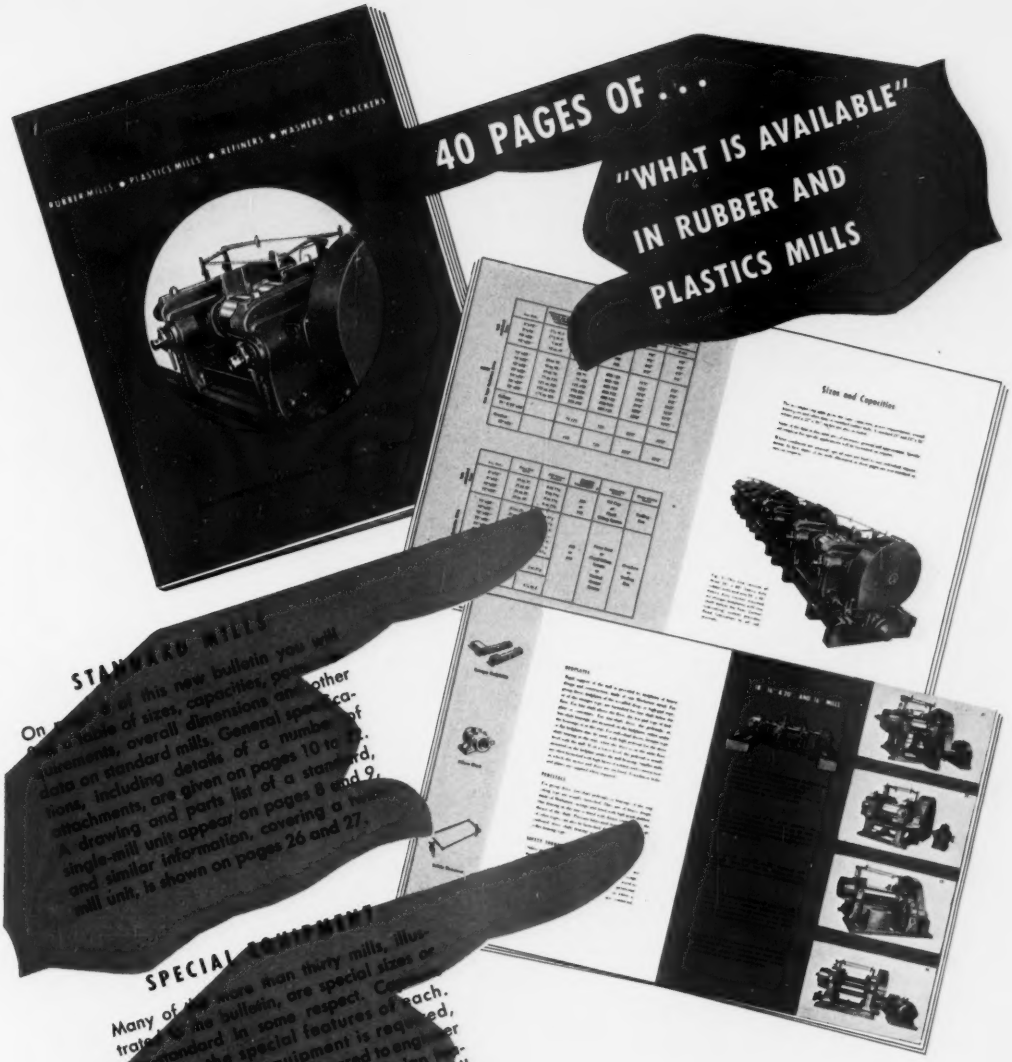
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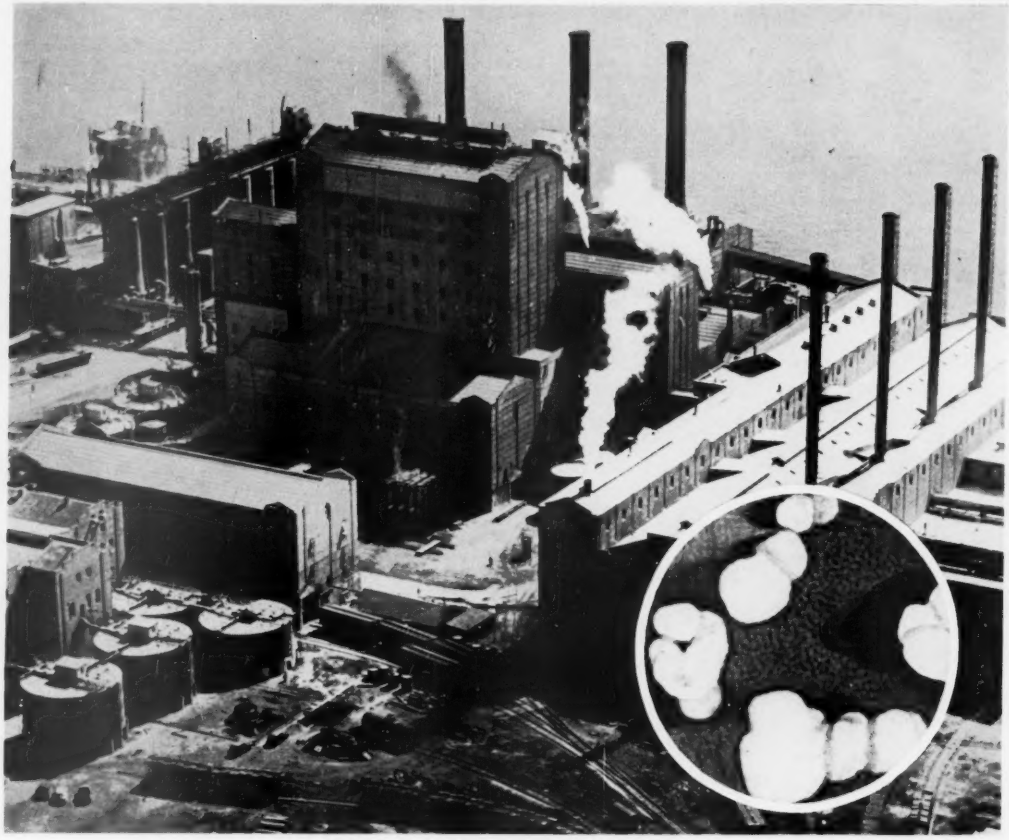

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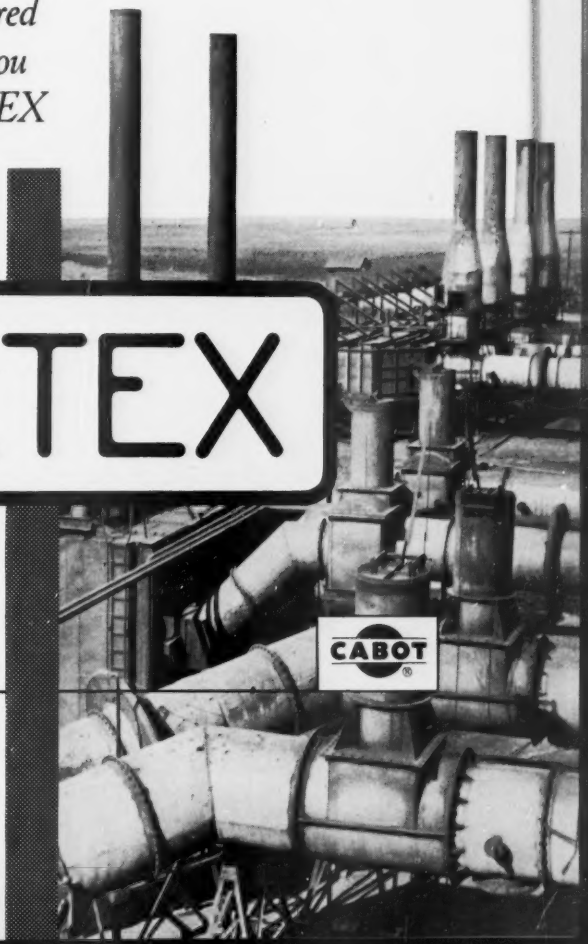


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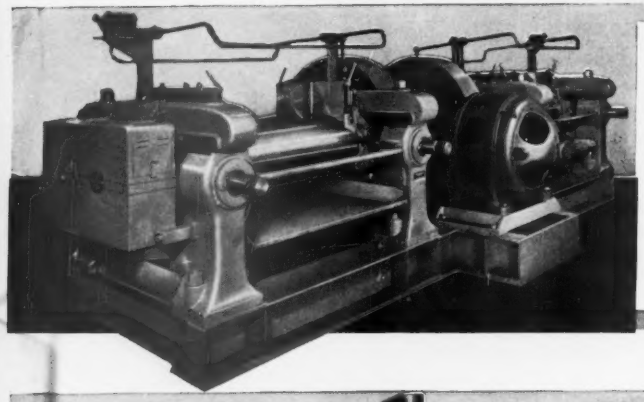

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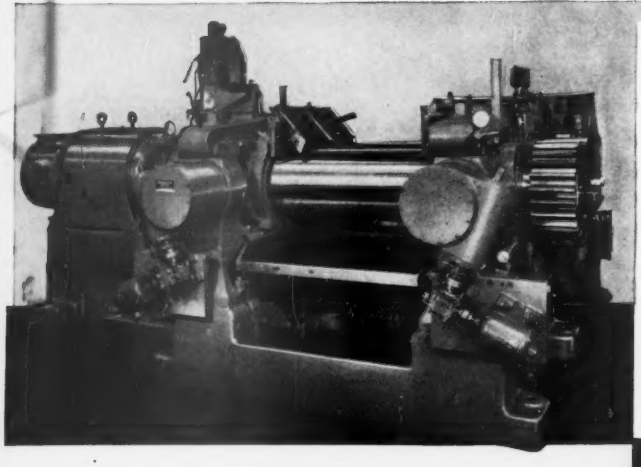

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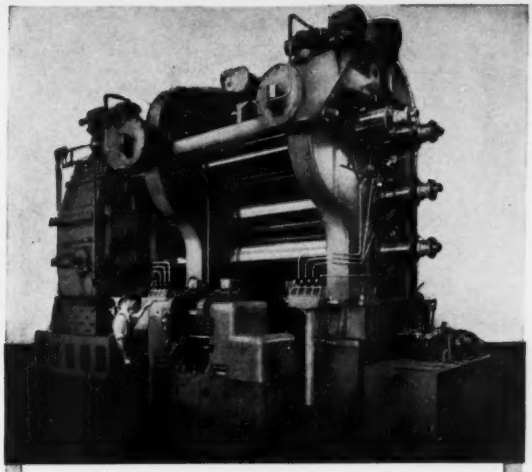

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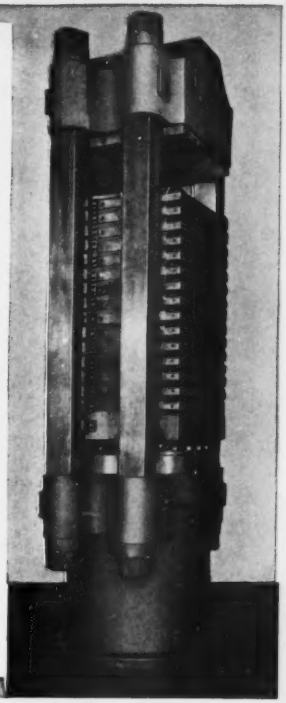

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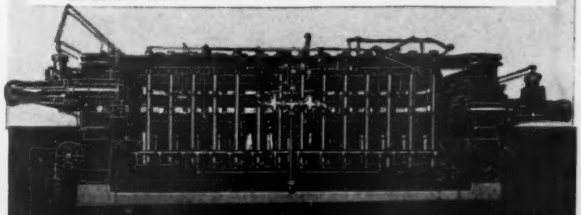

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RUBBER AGE

Vol. 67, No. 1 APRIL, 1950

# Determination of the Dynamic Properties of Rubberlike Materials by Means of a Modified Yerzley Oscillograph

By F. P. BALDWIN*

*Chemical Division, Standard Oil Development Co., Elizabeth, N. J.*

IN THE course of an investigation conducted in this laboratory it became necessary to measure the dynamic properties of various synthetic rubber compounds in order to determine the effects of compounding variables, polymer structure, temperature, and other factors. It was found possible to adapt a Yerzley Oscillograph to this work, once the mechanics of the instrument had been analyzed completely, and it was then found to serve as a practical means for measuring dynamic modulus and internal viscosity, provided certain experimental restrictions were observed.

In contrast to the more elaborate and expensive research instruments that have been designed and described for this purpose, oscillographs are widely available to rubber technologists throughout the industry, and it is therefore felt that a description of the method by which we have obtained and treated the data should be useful to those interested in measuring dynamic properties of rubbers.

The behavior of a vulcanized rubberlike polymer undergoing periodic deformation can be described in terms of two properties, the dynamic modulus and the coefficient of internal viscosity. It is well known that both depend upon temperature and frequency, as well as upon the structure of the polymer molecule, the degree of vulcanization, the compounding ingredients present, and similar factors normally encountered in preparing and studying particular rubber compositions. In fact, quantitative measures of the effects of the variables can be expressed by the values of these two physical properties.

## Mechanics of the Instrument

In order to avoid a detailed description of the original instrument the reader is referred to Yerzley's article *(1)* for the constructional details. In brief, the instrument, a diagram of which is shown in Figure 1, is a center-pivoted lever provided with means for supporting adjustable masses at each end. Attached to the lever by means of a knife edge support, whose center is displaced from the fulcrum, is an anvil or platen. Located above

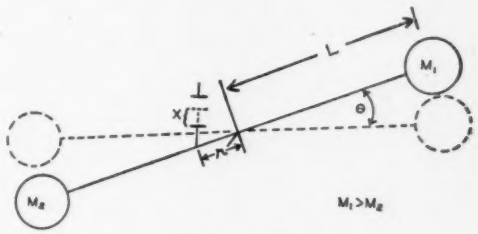


*Fig. 1 - Diagram of the Yerzley Oscillograph.*

* Currently on educational leave of absence as a Teaching Fellow in the Department of Physics, University of Notre Dame, South Bend, Ind.

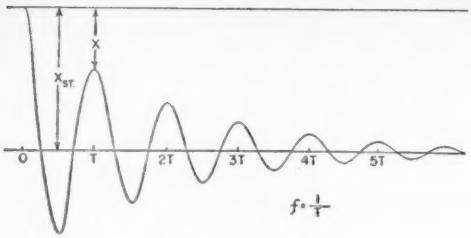


*Fig. 2 - A typical oscillogram.*

the latter and fastened rigidly to a supporting beam is another platen which can be raised or lowered by means of a calibrated adjusting screw. One end of the lever is fitted with a release catch device, enabling the lever to be anchored in any given position. The other end is fitted with a light recording pen arm by means of which the vibrations occurring during a test are recorded on a kymograph.

One convenient method (although not the only one) of making a test is as follows: Suitable masses are attached to each end of the lever, which is held fixed by the release catch. $M_1$ must be greater than $M_2$ in order to provide an operating torque for the apparatus. Once this requirement is met, the extent of loading furnishes a means of controlling the degree of compression in the specimen during test, as well as of altering the natural frequency of the system. The specimen, a cylindrical pellet 0.5" x 0.75" dia., is then placed between the two platens and the upper platen is lowered until it contacts the specimen. At the outset, therefore, the specimen is under no compression. The kymograph, fitted with graph paper ruled in millimeters, is then started and the catch on the lever released. This allows the heavier end of the lever to fall, thereby compressing the specimen. Thereafter, a series of free vibrations ensues, and the course of the deflection of the specimen is autographically recorded as a function of time. From the vibration pattern the required physical properties may be deduced. The necessary measurements (vibration amplitude and frequency) are indicated in Figure 2.

The mathematical treatment of this system as developed by Yerzley has been published *(1)* and will not be reproduced here. It will suffice to point out that Yerzley's treatment was incomplete; that is, his equations do not allow for the calculation of the internal viscosity and its interdependent properties (absolute and relative damping). The complete equation of motion for this system, together with its solution under the boundary conditions set forth previously, is given below.

Referring to the diagram of the Yerzley Oscillograph shown in Figure 1, the differential equation of motion for the system is

$$1. \qquad I\ddot{\theta} + (\eta A/\theta_h)\, r\dot{\theta} + KAr\theta/\theta_h = mgL$$

where
- $I$ = moment of inertia of system (g.cm.²)
- $\theta$ = angular deflection (radians)
- $\eta$ = coefficient of internal viscosity (poises)
- $A$ = cross-sectional area of test pellet (cm.²)
- $r$ = specimen-fulcrum lever arm (cm.)
- $K$ = elastic constant (dynes/cm.²)
- $\theta_h$ = angle subtended by unstrained test pellet (radians)
- $m = M_1 - M_2$ = excess mass on one end of lever (g.)
- $g$ = acceleration of gravity (cm./sec.²)
- $L$ = excess mass-fulcrum lever arm (cm.)

For small angles, $\theta$ may be replaced by $x/r$ and $\theta_h$ by $h/r$, where x is the pellet deflection and h is the unstrained height of the test pellet. Upon substitution and rearrangement equation 1 becomes

$$2. \qquad \ddot{X} + (\eta Ar^2/hI)\dot{X} + (KAr^2/hI)X = mgrL/I$$

Let

$$\eta Ar^2/hI = 2n \text{ and } KAr^2/hI = p^2$$

then equation 2 may be written as

$$3. \qquad \ddot{X} + 2n\dot{X} + p^2X = mgrL/I$$

The complete solution to this equation is

$$4. \qquad X = B \exp(-n + i\sqrt{p^2 - n^2})t + C \exp(-n - i\sqrt{p^2 - n^2})t + mgrL/p^2I$$

We now let

$$\sqrt{p^2 - n^2} = \omega$$

and transpose to trigonometric functions, obtaining

$$5. \qquad X = \exp(-nt)[D\cos\omega t + iE\sin\omega t] + mgrL/p^2I$$

where $D = B + C$ and $E = B - C$.

Inserting the boundary conditions described previously, we find that when $t = 0$, $x = 0$ and

$$6. \qquad D = -mgrL/p^2I = -mghL/KAr = -X_{st}$$

where $x_{st}$ is the static deflection of the pellet; that is, the deflection after the vibrations have ceased. Also, when $t = 0$ the velocity $\dot{x} = 0$; hence

$$7. \qquad E = nD/i\omega = -nX_{st}/i\omega$$

Therefore, equation 5 becomes

$$8. \qquad X = X_{st}\{1 - \exp(-nt)[\cos\omega t + (n/\omega)\sin\omega t]\}$$

Hence, the deflection of the pellet is seen to follow an exponentially damped sinusoidal oscillation whose angular frequency, $\omega$, is given by

$$9. \qquad \omega = 2\pi f = \sqrt{p^2 - n^2} = \sqrt{KAr^2/hI - (\eta Ar^2/2hI)^2}$$

where f is the frequency of vibration, in cycles per second. Equation 9 defines the elastic constant or modulus, K:

$$10. \qquad K = [(2\pi f)^2 + (\eta Ar^2/2hI)^2]\, hI/Ar^2$$

If we consider equation 8 for the particular instants, T, when $\omega t = 0, 2\pi, 4\pi \ldots 2n\pi$, that is, at the end of each succeeding vibration period, we have

$$11. \qquad X = X_{st}[1 - \exp(-nT)]$$

which can be rewritten as

$$12. \qquad \ln(X_{st} - X) = \ln X_{st} - nT$$

This defines the internal viscosity, $\eta$, in terms of the slope, n, of the log amplitude versus T curve, since, according to an earlier substitution,

$$13. \qquad \eta = 2nhI/Ar^2$$

Thus, a plot of the kymograph data according to equation 12, followed by an application of equations 10 and 13, enables $\eta$ and K to be evaluated*.

## Calculation of Damping Properties

An advantage of a forced vibration apparatus, aside from that realized in highly damped systems, is that in the operation of such apparatus a hysteresis loop can be projected by means of a light beam *(2)* or a cathode ray oscilloscope *(3)*. From this loop the modulus, K, can be evaluated in terms of the slope of the principal axis of the loop. The area of the hysteresis loop, when normalized in suitable coordinates, is referred to as the *absolute damping*. This is a measure of the energy expended in overcoming the viscous resistance of the specimen during one complete vibration. All of this

* In many cases measurement of the amplitude is difficult since the static deflection is not well defined because of transient drift phenomena. In these cases, and for that matter in all cases, the total displacement occurring in each cycle, rather than the amplitude, may be used. Experimental testing of this procedure showed it to be entirely satisfactory. Further, since we are plotting the logarithm of the total displacement it is not necessary that the displacement actually be evaluated. Rather, the logarithms of the chart deflections may be plotted directly without taking into account the lever arm factor, since this procedure will leave the value of the slope, n, unaltered.

energy is converted into heat in the specimen. Another important measurement is the ratio of the area of the hysteresis loop to the area under the compression curve. This ratio, expressed in per cent, is known as the *relative damping*. Both these damping properties are illustrated in Figure 3.

It would obviously be desirable to be able to deduce such data from measurements made with the Yerzley apparatus, which is, of course, a free vibration instrument. This can be done analytically in the following manner: Let us consider a forced vibrator operating through amplitude M. The displacement of the rubber, x, varies sinusoidally with time and the motion can be described by

14. $$X = M \sin \omega t$$

The velocity, V, is given by

15. $$V = \dot{X} = M\,\omega \cos \omega t$$

It is commonly assumed that for rubberlike materials the viscous force, $F_\eta$, is related to the velocity by

16. $$F_\eta = (\eta A/h)\, M\omega \cos \omega t$$

Expressing the velocity function in terms of displacement, one obtains for the work, $W_\eta$, done in a complete cycle, that is, the absolute damping.

17. $$\text{Absolute Damping} = W_\eta = 4\int_0^M F_\eta\, dx = 4\int_0^M (\eta A/h)$$

$$M\omega \sqrt{1-(x/M)^2}\, dx = \pi\omega\eta AM^2/h = 2\pi^2 f\eta AM^2/h$$

where f, as before, is the frequency in cycles per second. Now the work, $W_k$, done in overcoming the elastic force in the specimen during the compression cycle is given by

18. $$W_k = \int_0^{\pi M} F_k\, dx = \int_0^{\pi M} (KAX/h)dx = 2\ KAM^2/h$$

The total work, $W_t$, done in overcoming both the viscous and elastic forces in the rubber during the compression cycle is

19. $$W_t = W_\eta/2 + W_k$$

Hence the relative damping, by definition, is given by

20. $$\text{Relative Damping} = (W_\eta/W_t) \times 100 = 200/[1 + (2K/\pi^2\eta f)]$$

Hence, once $\eta$ and K have been measured, at a given frequency, by whatever means is suitable, substitution of the resulting values into equations 17 and 20 will yield the absolute and relative damping.

The terms absolute and relative damping, when examined in the light of these equations, provide important information about the behavior of rubberlike materials. For a given amplitude of vibration the absolute damping, or hysteresis loss, is proportional to the product $\eta f$. Also, for a given frequency of vibration, the hysteresis loss is proportional to the square of the amplitude. Since the absolute damping defines the amount of work expended in overcoming the internal viscosity during one complete cycle, and since this work is all converted into heat energy within the specimen, one obtains a quantitative measure of the dependence of heat build-up on $\eta f$ and amplitude. These effects are also observed with an instrument such as the Goodrich Flexometer *(4)*. In fact, useful relationships between absolute damping and both rate of temperature rise and maximum temperature attained have been derived and published by Springer *(5)*. Equation 20 shows that the relative damping is dependent upon the ratio $K/\eta f$. This provides a useful index from the compounding standpoint, since this ratio can be changed by changing either K or $\eta f$, both of which can be altered considerably through the use of fillers and plasticizers, and by the extent of vulcanization.

## Instrument Modification

In order to render the apparatus more suitable for these measurements, several modifications were made. The original storage case supplied with the instrument was converted into a cold chamber. This was done by providing the case with two 4" dia. insulated ducts leading to an Aminco Sub-Zero Test Cabinet. The case was insulated with ½" asbestos board and a slot was cut out at one end to accommodate the pen arm. To facilitate the insertion and removal of test pellets, a rectangular hole was cut in the top of the case and fitted with a removable wooden cover. A spring-loaded extension was made for the release catch so that the lever could be released from the outside. The case was also fitted with an American Instrument Quickset Rustproof Thermoregulator and a thermocouple well, both devices being located close to the specimen.

As for the instrument proper, four changes were made. A pen arm more suitable for our requirements was constructed from aluminum and substituted for the original. Several fractional weights were constructed in order to expand the frequency range, and more important, to allow all specimens to be tested at very nearly the same strain, a feature which will be shown to be of great importance. The lower platen was tapped to provide a circular indentation about .003" deep and slightly greater in diameter than the test pellet. This provided a convenient means for rapidly mounting the specimen at the center of the platen. The surfaces bearing against the two metal guide strips attached to the bottom platen were removed, since they gave rise to a significant and variable amount of friction.

## Calibration of Beam Inertia

Because of the modifications listed above, the inertia beam required rebalancing and it became necessary to calibrate the beam inertia as a function of the number of weights used. In order to accomplish this, a steel spring was obtained and its static modulus was measured.

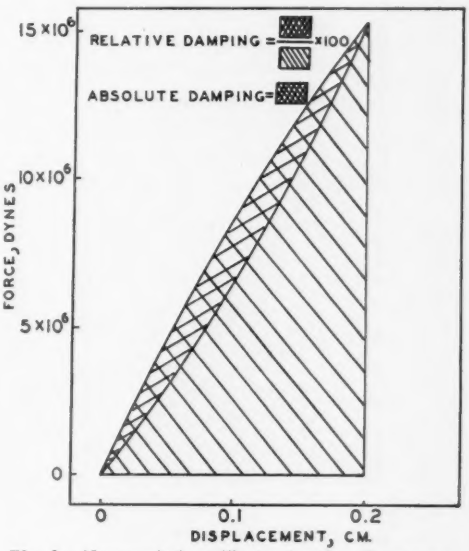


*Fig. 3 - Hysteresis loop illustrating damping terms.*

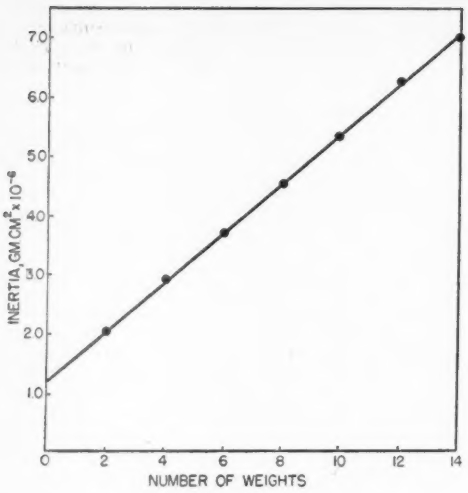


*Fig. 4 - Plot of inertia calibration data.*

The reasonable assumption was made that the static modulus of the spring would be identical with its dynamic modulus at the test frequencies employed.

The dynamic modulus is related to the inertia of the beam (plus weights), I, the length of the spring, h, the frequency of vibration, f, and the length of the lever arm between fulcrum and spring, r, by the equation

$$K_{dyn} = (2\pi f)^2 \, hI/r^3 \qquad (21)$$

and since $K_{dyn.} = K_{st}$ for the steel spring, the inertia can be readily evaluated by equation 21. The calibration data are shown in Figure 4.

## Determination of Machine Friction

The amount of friction in the apparatus, embracing the combined effects of the knife edge supports, air resistance, and the pressure of the recording pen against the kymograph, was also evaluated with the metal spring. It was assumed that the spring was frictionless. The decrease in vibration amplitude with time was used to measure the total friction in terms of an effective viscosity of a rubber pellet of the standard dimensions. The data obtained are shown in Figure 5.

As might be expected, this effective viscosity, or friction, increases with the number of auxiliary weights used during test. However, the values obtained at the various loads represent a range of only $2 \times 10^3$ to $4 \times 10^3$ poises, and since for most rubber compounds the internal viscosity is of the order of $10^6$ poises or more, at temperatures of usual interest or importance, the frictional component introduced by the apparatus is negligible. If desired, however, correction factors may be deduced from data similar to those shown.

## Experimental Technique

*(a). Influence of Strain:* One of the important factors in making comparative measurements with this instrument involves the characteristic behavior of rubberlike materials in compression. Figure 6 shows a comparison of the static and dynamic modulus of a specimen as a function of the strain in the specimen during test. To obtain the static modulus curves, two of which are shown in the figure, a load-deflection curve was obtained with the apparatus. The curve for the cumulative static modulus was plotted from the values of the applied stress and the resulting strain. The incremental static moduli were obtained from the point slopes of the load-deflection curve. The strains defining the dynamic modulus plot are the mean values about which the vibrations occurred.

It is seen that the magnitude of the difference between the dynamic modulus and the static modulus depends upon the manner in which the latter is defined, and depends in either case upon the strain at which the measurements are made. The difference between static and dynamic modulus will also doubtless depend upon the type of polymer and the temperature. It is interesting to note that, as zero strain is approached, the three curves converge, and for very low strains the modulus becomes practically independent of the method of measurement.

Figure 7 shows the effect of strain on internal viscosity and relative damping. It will be observed that a minimum exists in both curves. The increase in internal viscosity (or relative damping) as zero strain is approached has been observed by Naunton and Waring *(6)*, and the steady increase with increasing strain, which occurs beyond the minimum, is similar to the behavior of modulus as a function of strain, and is probably attributable to a shape factor.

In this connection, it has been shown *(7)* that the modulus of a rubber cylinder or rectangular block de-

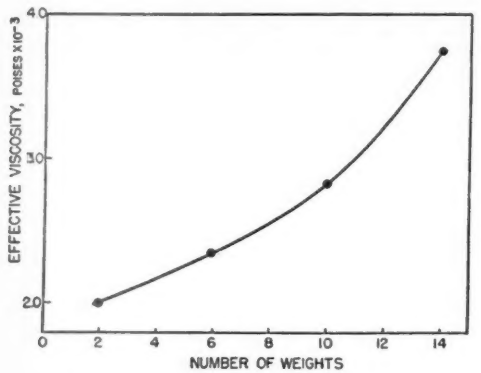


*Fig. 5 - Plot of combined friction data.*

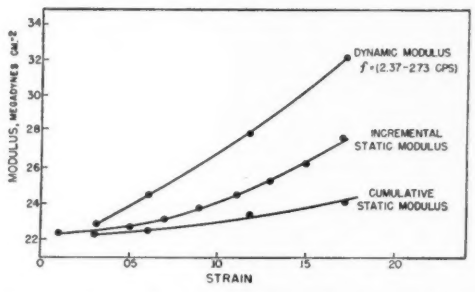


*Fig. 6 - Effect of strain on static and dynamic modulus.*

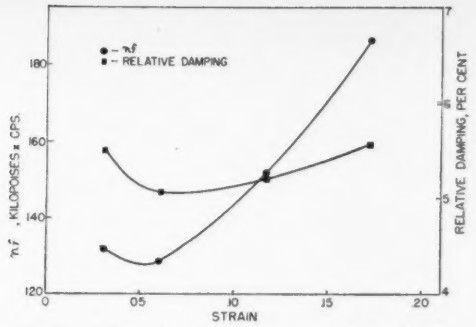


*Fig. 7 - Effect of strain on hysteresis loss and relative damping.*

pends upon the ratio of the loaded area to the free or bulge area. As this ratio increases the observed modulus also tends to increase. It is likely that a similar dependence of observed internal viscosity on this ratio exists. The observations of Harris *(8)* are in accord with these results.

The above data emphasize the necessity for testing all specimens under the same conditions of strain. This factor becomes increasingly important when comparative work is being done.

*(b). Influence of Frequency:* An important characteristic of rubberlike materials concerns the change in physical properties resulting from a change in the deformation frequency. The relevant conclusions arrived at by some of the earlier workers *(2, 6, 8-14)* in this field appeared, at first sight, to be contradictory. In some cases it was shown that the dynamic modulus was independent of frequency, while in other cases the dynamic modulus was shown to increase with increasing frequency. Likewise, some experimentors indicated that the product $\eta f$ was practically invariant with frequency, while others showed that $\eta f$ increased with frequency. The reasons for these discrepancies are now apparent, since it is well known that the dependence of these properties on frequency varies with the kind of polymer tested, the frequency range covered, and the temperature of testing.

As it turns out, most of the older data are complementary when all of these factors are taken into consideration. The dynamic moduli of hevea and a synthetic rubber are shown in Figure 8 as a function of frequency, for various temperatures. It will be noted that the dependence on frequency over the narrow range investigated is predominantly influenced by temperature. In this respect it is observed that the frequency dependence of modulus for both rubbers illustrated decreases with increasing temperature. This result is in accord with the mechanistic theories of rubberlike behavior *(19)*. Other experimentors *(15-18)* who have obtained data over much greater frequency and temperature ranges have shown important differences between different polymers with respect to the frequency dependence of modulus at a given temperature level.

The dependence of the hysteresis losses ($\eta f$) on frequency is of perhaps greater interest. Illustrative data, for a synthetic specimen showing a marked effect, are reproduced in Figure 9. Actually, for hevea (data not shown) the losses are relatively independent of frequency, and it is easy to see how some of the earlier conclusions arose. On the other hand, the synthetic

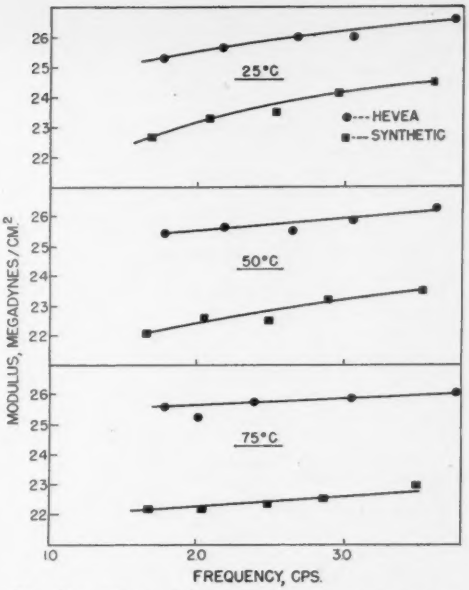


*Fig. 8 - Effect of frequency and temperature on modulus of hevea and a synthetic.*

shows a pronounced frequency dependence, the extent of which increases as the temperature is lowered.

The importance of this observation is that as the frequency is raised the hysteresis losses will increase accordingly, for it has been shown (equation 17) that the absolute damping is proportional to the product $\eta f$. Hence, as the frequency is increased, the polymer will become less elastic. It will be recognized, however, that the relative damping may not be subject to as strong

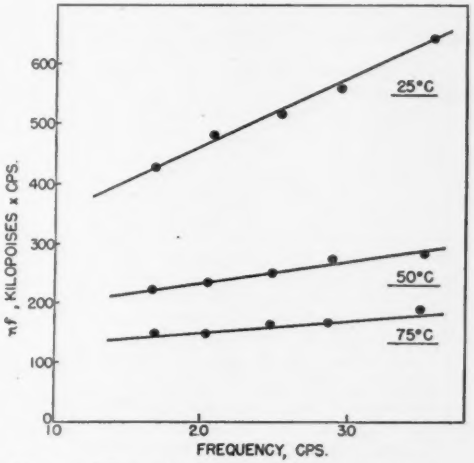


*Fig. 9 – Effect of frequency and temperature on hysteresis losses of a synthetic.*

a frequency dependence because it is dependent on the ratio $K/\eta f$. Hence, the rate of increase of relative damping with increasing frequency will depend on the manner in which both K and $\eta f$ vary.

The best fit to these limited data is a set of straight lines, as shown in Figure 9. However, it must be remembered that this frequency range is very narrow, and data obtained by other investigators *(15-18)* over much wider frequency ranges show that hysteresis losses increase with frequency up to a point, but pass through a maximum and eventually decrease with increasing frequency. The position of the maximum on the frequency scale depends upon the polymer composition and the temperature.

These data illustrate another experimental restriction which must be observed when critically evaluating various compounds or rubbers. All specimens should be tested at nearly the same vibrational frequency. Alternatively, data may be collected at several frequencies, and comparative results obtained by interpolation to a common frequency.

## Reproducibility of Results

Table I contains some reproducibility data for a synthetic rubber vulcanizate whose vibration pattern allowed the use of a 5-cycle count in determining the frequency and decay of amplitude Two different specimens were used and three runs were made with each. Each run consisted of taking two vibration patterns with a single insertion of the test pellet between the platens. On succeeding runs the pellet was removed and reinserted.

The average values of modulus and hysteresis losses ($\eta f$) are in very good agreement. The average and maximum deviations from the mean are quite low for K, but are somewhat higher for $\eta f$. The latter error probably arises principally from deviations in the recording pen friction and tends to be accentuated, percentagewise, when the measured viscosity is relatively low (in this case $6 \times 10^4$ poises). If the vibration pattern is such that counts must be made over fewer cycles, the errors in both K and $\eta f$ tend to increase. However, if proper analytical procedure is followed, the maximum deviation from the mean seldom exceeds about 8% and the constants are reproducible within $\pm$ 4%.

## Summary

In the interests of brevity, the above discussion has been limited to a description and mechanical analysis of the modified Yerzley Oscillograph, the method of evaluating elasticity and viscosity coefficients and related damping properties. Necessary operational techniques, precautions, and experimental reproducibility have also been discussed. Although beyond the scope of this article, it can be pointed out that data obtained by this method have furnished much useful information on the comparative damping and hysteretic properties of various rubbers, the effects of compounding ingredients, plasticizers, state of cure, and polymer structure, and have provided quantitative measures of low temperature stiffening.

ACKNOWLEDGMENT

It is a pleasure to acknowledge the assistance of John Rehner, Jr., for valuable discussion and a critical review of the manuscript, James K. Creel who conducted the majority of the experimental work, and Dennis L. Crow for the preparation of the graphs.

TABLE I - REPRODUCIBILITY DATA
(5-Cycle Count)

| | Specimen 1 | | Specimen 2 | |
|---|---|---|---|---|
| | K (Megadynes $cm^{-2}$) | $\eta f$ (Kilopoises $\times$ cps) | K (Megadynes $cm^{-2}$) | $\eta f$ (Kilopoises $\times$ cps) |
| Run 1 | 22.55<br>22.64 | 176.30<br>179.81 | 22.50<br>22.84 | 185.68<br>177.39 |
| Run 2 | 22.71<br>22.59 | 171.34<br>174.87 | 22.46<br>22.46 | 177.26<br>175.63 |
| Run 3 | 22.61<br>22.39 | 175.73<br>176.18 | 22.61<br>22.59 | 168.92<br>168.64 |
| Average | 22.58 | 175.71 | 22.58 | 175.59 |
| Maximum Deviation | 0.35% | 1.34% | 0.53% | 3.88% |
| Average Deviation | 0.25% | 0.91% | 0.34% | 2.59% |

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**Safe Buna N Compounds.** Naugatuck Chemical Division of U.S. Rubber Co., 1230 Avenue of the Americas, New York 20, N.Y. 8½ x 11 in. 8 pp.

The use of retarders to improve the processing safety of nitrile rubbers is covered in this technical report. Results are shown on a typical oil-resistant mechanical goods compound, with four accelerator variations, to which was added Delac J, E-S-E-N and salicylic acid on an equal weight basis, the company's materials also being checked on an equal cost basis. The results cover both Mooney scorch at 250° F. and press scorch at 10 lbs. Specific data on both Delac J and E-S-E-N is also furnished in the report, including chemical name and formula, physical properties, compounding properties, and recommended uses.

# Panel Discussion on Rubber Mixing and Extruding Equipment

## Sponsored by the Akron Rubber Group at Its Meeting on February 3, 1950

BY REASON of industry interest in the subjects, the panel discussion on rubber mixing and extruding equipment which featured the February 3rd symposium on that subject held by the Akron Rubber Group at the Hotel Mayflower in Akron, are reproduced herewith. The panel discussions followed the addresses of Donald A. Comes, assistant general sales manager of Farrel-Birmingham, Inc., Ansonia, Conn., and Allen L. Heston, vice-president of the National Rubber Machinery Co., Akron. Mr. Comes spoke on "Rubber Mixing Machinery," while Mr. Heston addressed the group on "Rubber Extruding Machinery."

C. A. Ritchie (Goodrich), chairman of the group, acted as moderator for the question-and-answer periods which followed the addresses. Members of the panel included George Bruggemeier (Firestone), Paul Beebe (Goodyear), A. W. Phillips (General Tire), R. H. Wattleworth (Goodrich), and P. Fay (U. S. Rubber).

### ABSTRACT OF MR. COMES' PAPER

Mr. Comes discussed the principles of Banbury operation and noted those conditions under which the various types of Banburys can be expected to do their best work. He recounted personal experiences showing how individual problems are solved by the correct application of the unit to the particular job. Portions of his address were devoted to the questions of speed, pressure and hp ratings in relation to the type of material being worked. Mr. Comes discussed how thinking along these lines has changed during the years and outlined several current theories on the subject.

Of particular interest was that portion of his address devoted to reclaiming in a Banbury mixer. Mr. Comes said that factory scrap which is either completely vulcanized, partially vulcanized, or completely unvulcanized, and which is backed with any material, may be loaded in a Banbury to produce a high-grade reclaim at extremely low cost. This is done, he said, by the proper applications of speed, pressure and horsepower.

Another section of his address which evoked enthusiastic response was his discussion of "upside-down" mixing. Mr. Comes said that he had first practiced this mixing method fifteen years ago, and explained how it happened to come about. Other factors touched on by the speaker included the question of proper dispersion, methods of loading the Banbury and compounding problems. Mr. Comes' address was followed by a panel discussion.

## Discussion on Rubber Mixing Equipment

**Question**—What are the advantages and mixing cycles to be considered with respect to straight mixes vs. masterbatches? Loose black vs. GR-S master?

***Answered by Mr. Phillips:*** The use of direct mixing will probably cause a little longer mixing time and longer cycles. It will also reduce mixing costs over a long period of time with a large volume. Experience indicates the temperature in a direct mix batch will be higher than that of a masterbatch type of mix. A rapid cure batch, particularly, will require proper cooling. This is especially true with a No. 11 or No. 27 Banbury. There are some advantages to the masterbatch method, but it is a more expensive manner of producing the same given result. The lowest cost mixing I have ever seen was in a No. 27 Banbury, slow speed, with three 84-inch mills and overhead mixers.

The question of black master vs. loose black is especially interesting from a production standpoint. In the black master system, the first benefit to be derived is cleanliness. Black that is ordinarily lost through dust collecting systems is saved. There is also less worry about inventory, cooler mixing, lower temperatures on lower mixing cycles and more uniform results.

**Question**—Is there a tendency for the rubber industry to move toward the use of heavier mixing equipment? Why?

***Answered by Mr. Comes:*** We find that when GR-S is used it calls for an increase in power. Heavier loads call for heavier equipment. The figure of a No. 11 Banbury running at 20 and 40 rpm using 400/800 hp shows that the tendency is already a fact. Heavier machinery produces better dispersions, lower mixing costs, and higher production.

**Question**—Is the tendency toward the use of higher speed Banburys? What are considered the most practical mixing speeds?

***Answered by Mr. Wattleworth:*** I don't believe that we are going to go to higher speeds than we already have unless we are talking about special purpose equipment. We now have 20, 30 and 40 rpm No. 11 Banburys which raised a considerable amount of interest during the war period. The 20 rpm No. 11 Banbury fits in very well with the hand batchout whereas the 30 and 40 rpm practically require a mechanical means of getting the stock

away from the mills. As we go into labor savings and as we go into those parts of our production that lead to economy, handling of labor, etc., the 30 and 40 rpm Banburys fit into the question and consideration of the most practical mixing speeds.

In my experience, there are very few stocks of a general nature that cannot be mixed on a 30 rpm machine. Personally, I like 40 rpm for special purpose equipment. It slaps the material together in a hurry and develops a high heat quickly. There are advantages, and I believe that with the proper set-up, the proper formulation and the proper kind of arrangement for taking the stock away from the mill, there is a very practical place for the 40 rpm machine in our industry. Generally speaking, for a general purpose machine my preference tends toward the 30 or 20 rpm where the batchout is by hand.

**Question**—What are the latest developments concerning automatic Banbury mixing?

***Answered by Mr. Comes:*** Automatic handling of the Banbury covers both the loading of the material into the hopper and then removing the finished mix. This can be done with a sheeting mill or with a screw machine. The screw machine can convert the mix into pellets which are very adaptable for automatic handling, or into slabs. At the present time we are working on a screw machine which will refine, strain, pelletize, etc. A conveyor belt brings the compound to the hopper, The operator's position is far removed from any possible danger point. However, all these new mechanical devices are expensive. As an example of automatic handling, one man operating a $45,000 electrical control panel was able to run eight No. 11 Banbury mixers.

**Question**—What is the most satisfactory method for plasticating rubber or GR-S? Banbury single rotor or two rotors vs. plasticator?

***Answered by Mr. Bruggemeier:*** The selection of a single rotor Banbury, two rotor Banbury, or the plasticator depends on the production process. The selection of any one of the three depends, in part, on what major type of rubber is to be processed. Whether any one of the three types is selected, breakdown or plasticity must be controlled by time, temperature, and number of passes.

**Question**—What is the most satisfactory procedure or procedures used to obtain good dispersion of pigment into rubber or GR-S?

***Answered by Mr. Beebe:*** Here are a few opinions on the utilization of the Banbury and its method of operation that may affect dispersion. As far as speed is concerned, any speed up to perhaps 50 rpm is satisfactory for tire stocks. As far as clearance is concerned, the danger is on the small or thin clearance. Manufacturers' clearance is 3/16-inch, rotor to shell. Personally, I prefer a clearance of ⅜-inch. From that point until the point of wear-out the shell has never caused any trouble.

Another item that can become troublesome is the pressure on the floating weights. A pressure of about 60 pounds per square inch on 11-inch rams and 125 pounds per square inch on 8-inch rams is preferred. Anything higher tends to make the ring problem troublesome and promotes packing and dust loss.

On the question of temperature, trouble will generally be encountered when the Banbury gets too cold. I agree with Mr. Comes that shear action occurs between the rotors and the shell, and in order to get this action the rubber must adhere to the shell. If adherence does not occur, stock merely rolls ahead of the rotors and only a kneading action is obtained.

Stocks will stick better to a warm shell than to a cold shell. Or to put it another way, if a choice had to be made between having either 50° or 90° water, assuming the cooling systems were different, I would unhesitatingly choose the 90° water. After all, the number of BTU's removed from the batch are negligible, and therefore temperature differences will be almost negligible.

**Question**—What is the most satisfactory method of controlling uniformity in Banbury mixing—Esterline Angus Watt meter or temperature control?

***Answered by Mr. Wattleworth:*** The Esterline Angus Watt meter is very important and the best one to use predominantly because of the lag in temperature between thermocouple and the stock within the Banbury. At one time it was felt that we had to have an Esterline Angus Watt meter picture of each batch that was mixed. Now for the control of the material that comes from the Banbury, our thinking has changed. It is recognized that temperature is a very important part of the control as the stock comes from the machine. To check the cycle of the operator and to check the method of the addition of the materials, the Esterline Angus Watt meter, of course, is the most practical equipment. To check the workability and the quality, my vote would be for a good temperature device.

**Question**—What is the best mill speed, that is, surface speed in feet per minute, on rolls for mixing and warm-up mills?

***Answered by Mr. Wattleworth:*** The front roll speed of the 60-inch and 84-inch mill is pretty generally typed by the convenience and the safety of the mill operator. Approximately 75 feet a minute for a 20-inch diameter roll maximum and 100 feet a minute for the 84-inch roll is the most practical front roll speed, or the speed of the roll on which the mill man works. Lower speeds are used, of course, but there a special purpose piece of equipment is involved. A 26-inch roll could go slightly over the 100 feet a minute. The 22-inch roll would go under the 100 feet a minute.

As far as ratio between rolls is concerned, there is a wide divergence of opinion. An all-purpose or a general-purpose mill should have a ratio between the front and back roll of approximately 1.25 to 1. That may vary from 1.2 to 1.3. The ratio between front and back roll is not as important today as it was twenty years ago. I think of the Banbury itself as the mixer where the volume material is being put. We have to go back quite a way to find the really large volume 84-inch or 60-inch mill mixing. It is not, however, a lost art by any means. In the smaller plant where No. 11 or No. 27 Banburys are not used, it is the only means of mixing. The figures of speed and ratio represent the most practical operating conditions for not only front roll speed, but also mill roll ratio.

**Question**—What are the most satisfactory mixing procedures to use with stocks which have a tendency to scorch?

***Answered by Mr. Fay:*** I doubt if this question can be answered directly because the possibility of scorching is always present to a greater or lesser degree in practically all mixing operations in which sulfur is one of the ingredients. Among the many factors to be consid-

ered are the following: (1) Order in which the ingredients are fed into the Banbury; (2) Use most effective method of cooling; (3) Adding sulfur at the last moment before discharge; (4) Omitting sulfur in the Banbury batch and adding it on the mill; (5) Maintain low discharge temperatures; (6) Additional rubber breakdown. When using stocks that have a high tendency to scorch, maintain low temperatures, short cycles, and small batches.

**Question**—What are the most practical mill settings to use for satisfactory mixing? Is the use of cocked mill rolls to be recommended for fast mixing?

***Answered by Mr. Wattleworth:*** I believe in establishing mill settings for each batch. The batch or mill setting depends upon the type of stock being mixed, its scorch characteristics, the temperature build-up, etc. After all, the largest part of the heat developed in the mixing operation is removed through the mill rolls, and logically, the heavier the band of stock around the front roll the more difficulty the stock heat has of getting to the cooling water that is taken from the mill.

Normally a stock which has a pre-scorch or high pre-cure characteristics would be mixed in a smaller batch with a smaller bank and smaller band around the front roll, therefore, tighter mill settings. On the Banbury work, the same feature exists for the Banbury sheeting mill. There again, however, another characteristic that will tend to influence the mill setting is present. Generally in the Banbury sheeting mill it is much more important to keep stock on the front roll of the mill than in normal mill mixing. Therefore, as we have the problem of keeping the stock on the front roll, we may adjust the mill setting.

Cocked mill rolls are used at times in a strip mill, and I know that in quite a few places in order to make the bank feed from one end of the mill to the other without having a mill man do the work, the mill rolls are cocked. I do not recommend it. I think there is a much better, safer and more convenient way of handling the problem. My particular preference is to use a traveling strip knife which permits the stock to come free from the mill roll. That is, the strip is taken away from the mill across the mill roll rather than for nature to take its course moving the stock from one place to another. As far as mixing is concerned, I see no particular advantage at all in the mixing of ingredients into the batch.

**Question**—What is the most satisfactory way to determine batch sizes for Banbury mixing?

***Answered by Mr. Fay:*** I will have to qualify my answer to suit, among others, the following factors: (1) Tendency of the batch to scorch; (2) Power load; (3) Whether using bag black or bulk handled black. When using bag black it is customary to proportion the batch size to use even batch quantities; and (4) Banbury size. I have in my files, under date of 1943, a formula which I believe was given us by the Farrel-Birmingham Co. as a guide in determining Banbury batch size:

| *Banbury Size* | *Capacity Cubic Inches* | *Constant* |
|---|---|---|
| 9 | 11,443 | 264 |
| 11 | 15,469 | 372 |
| 27 | 34,144 | 816.66 |

To determine batch weight, multiply the specific gravity of the stock by the constant. It should be understood that this formula is for new Banburys with minimum clearance between rotors and sides, and again is used only as a guide. Under certain conditions, we have batched Banbury stocks greatly in excess of that obtained by the formula.

**Question**—What is the advantage in the use of the lower mill roll ratios which has been a recent trend in the rubber industry?

***Answered by Mr. Wattleworth:*** There has been a trend towards lower mill ratios in the industry recently, and I think it generally ties in with the trends we have previously discussed. Back in the old days a considerable number of 84-inch mills were tied up in masticating and blending rubber. At the present time, very few are occupied in this work because of new equipment such as high-speed Banburys and plasticators. At the present time, the mill is a convenient way of handling stock as it comes from the Banbury. Understandably, the lower the mill roll ratio, the lower the power required. The better cooling that we have, the less heat build-up will result in the stock on a sheeting mill. Logically, we should go into the lower mill roll ratios.

**Question**—What are the recent trends in the use of continuous warm-up and mixing equipment?

***Answered by Mr. Bruggemeier:*** The future looks encouraging if the present development work on new equipment continues or is accelerated. Of course, in all continuous operations the rubber must be prepared in such form that it can be continually and automatically fed to the machine. This may limit large scale adoption for some time. At the present time, there are several companies attacking the problem with both laboratory and production-size equipment.

The machines can be classified in six general headings: First, the single screw; second, the twin screw with both screws operating in the same direction; third, twin screws with the screws operating in opposite directions; fourth, twin smooth rolls with the rolls totally enclosed with a spiral scroll in the case; fifth, the three-roll machine with the middle roll scrolled and partially enclosed with a smooth surfaced encasement. The sixth unit is a new development by Farrel-Birmingham, details of which are not presently available.

Now as to warm-up and blending. Here all the machines have some merit with the matter of temperature being a possible limitation. Little work has been done up to the present on continuous mixing, but it would appear that certain of the machines have advantages over the others as far as mixing is concerned.

It is interesting to note that all of the machines mentioned here, with the possible exception of the 6th Farrel-Birmingham unit, can function as extruders. Eventually, the compounder may be able to warm-up, blend, and extrude in one operation. Any new development replacing present mill-mixing or Banburys will have to be very good when the investment in present equipment is considered. I do not think that any new type continuous equipment will be generally adopted until it has really been proven.

**Question**—What is the most satisfactory method to use on Banburys or mills to handle sticky stocks such as heavily-loaded butyl?

***Answered by Mr. Fay:*** In a discussion of this question with the men who are closest to our mill room processing problems, the following suggestions were made: (1) The importance of the order in which ingredients are introduced into the Banbury—some experimentation may be necessary; (2) Large nip between the rolls; (3) Keep mill rolls smooth and clean. Rolls that are scored, rough or pitted will give lots of trouble in getting the stock off the mill; (4) Get stock off the mill as quickly as possible;

(5) Using the same mills continuously for butyl stocks causes a glaze to form on the surface of the rolls, reducing the tendency of the stock to stick to the roll; (6) The importance of temperature differential between rolls. This factor is deemed of prime importance.

**Question**—Discuss the advantages of "upside-down" mixing vs. conventional mixing.

***Answered by Mr. Comes:*** "Upside-down" mixing is really throwing all the ingredients into the Banbury at one time and slapping the weight down on top of it creating a tremendous horsepower peak in the very early part of the batch. I have seen a No. 11 Banbury peak to 900 hp in the first minute. The reason this gives a successful dispersion is again the principle of applied horsepower to a very stiff mass. By throwing all the ingredients in at one time the rubbers break into very small pieces heavily coated with pigment and as these break over from a grizzly mass to a solid plastic the maximum amount of horsepower or the maximum amount of working is derived.

I am not an advocate of upside down mixing. The same thing can be accomplished in the same period of time with much less strain on the equipment by adding the ingredients in the proper sequence and allowing time for the base to pick up the fillers.

Some amusing problems in making Banburys are often encountered. We have just made a complete ABK metal mixing body which is very highly resistant to abrasion. It is being used in the asphalt tile field. This side has polished itself to an extremely high point which would be advantageous in the mixing of plastics or certain rubber stocks, but is certainly not so in the case of asphalt tile. Mr. Beebe mentioned having hot Banbury sides so that the material will not slip. In upside-down mixing the entire mass is broken into a very rough state which prevents slipping to a great degree. This is the reason for the high horsepower and excellent dispersion.

## ABSTRACT OF MR. HESTON'S PAPER

At the conclusion of the panel discussion on Mr. Comes' paper, the floor was taken by Mr. Heston who spoke on extruding equipment. The speaker listed eleven conditions affecting extruder performance and then discussed the conditions which are directly dependent on the machine. These include type and style of the die head used; temperature of cooling and heating medium available; screw clearance in cylinder; thrust bearing and drive; screw and cylinder characteristics and dimensions; and size, contour and location of the feed hopper.

Mr. Heston stressed the importance of determining the extrusion characteristics of the compound to be run before selecting a specific type of machine for production. GR-S and GR-I require modification of the feed screw, he said, and recently it has been found that cold rubber is best extruded with still another type of screw, usually of depressing pitch and chrome plated or of stainless steel.

The latest type of tuber, fitted with a special cold feed cylinder and screw, was described by the speaker. He said this is particularly suitable for segregated departments of large plants or for small mechanical goods plants where warm-up mills or Banburys are not available and stocks are received cold from outside sources.

The panel discussion of extruding equipment followed Mr. Heston's address. The questions were again submitted by Mr. Ritchie to the panel. The questions and answers follow:

# Discussion on Rubber Extruding Equipment

**Question**—What are the advantages of fixed pin die vs. adjustable pin and die for extruding, particularly on thin gauge articles?

***Answered by Mr. Phillips:*** As I understand the question, it pertains largely to tubular extrusion. In my experience the fixed pin mandrel or anvil pin does a very good job of eliminating spider marks. It also permits faster extrusion at lower temperatures, and permits for a little easier die adjustment where only the die ring need be adjusted. I presume that for tubing gauges thinner than inner tube thicknesses there may be other angles I am not familiar with. My own experience has been entirely with water bags and inner tubes of reasonably thin gauge. For those, the fixed pin does a pretty good job. It is also a lot easier to train an operator to make adjustments.

**Question**—In the design of extrusion dies, is there any significance regarding length of die proper, the angle or contour of the inner slope and the thickness of the plate as applying to speed and smoothness of extrusion, swelling characteristics, etc.?

***Answered by Mr. Heston:*** My answer to the question is yes. Very definitely the design of a tuber die is most significant to the operation of the machine, particularly the length of the die. I believe this question may be applied to the die head as well as the die proper, so to the designer I suggest a rough rule or "rule of thumb." Keep the die as close as possible to the end of screw and a better job of extrusion will result. Generally, the die should be within about one and a half screw diameters from the end of screw.

As to the angle or contour of inner slope, the answer there, of course, is keep it smooth, and diverging as gradually as possible from the diameter of the cylinder to the die itself. In other words, streamline the inner contours. In wide extrusion such as the unit tread and sidewall combinations, it is necessary to heavily choke the center portions and divert the flow to the edges. There temperature control of the head, particularly at edges, separately from that temperature maintained in the center of the die head, will have an important bearing on the extrusion itself.

As to swelling characteristics, they are usually dependent on (1) the condition of the stock, (2) compound, and (3) the pressure of the die. The smoothness, however, may be controlled by, or be a factor of, the die contour. One application here of the old principle of hydraulics may be applied in that the die-maker should understand that he cannot expect a smooth extrusion by making the edge of the die sharp or at right angles.

Most die-makers do understand the importance of a diverging angle on the leaving (or discharge) side of the die, which does produce an ironing effect on the surface of the extruded product.

**Question**—Is it possible to control the temperature of tube machine dies—with gas, steam or electricity? What are the general effects on tubability of non-uniform die temperatures?

***Answered by Mr. Heston:*** In rubber extrusion or tubing synthetic materials it is usually necessary to warm the die. Pre-warm, before starting the extruder. This can be well done with gas, but I have not had any experience whatsoever with controlling die temperature when using gas. It is a common practice working in thermoplastics to use electrically-heated dies with thermostatic control.

More important than the heating, however, is being able to cool parts of dies. With those extrusions requiring the inner mandrel or pin, it is desirable to have a circulating cooling medium through that portion of the die. It is also common practice in inner tube dies to make the inner contour (cone) of aluminum or aluminum alloy, not only for lighter weight to facilitate handling, but for the better heat transmission that aluminum provides.

**Question**—What is the most economical method of producing heavier gauges of sheet stock? Tube machine vs. calender? Why?

***Answered by Mr. Beebe:*** An extruder can be used successfully and economically for certain types of heavier gauge sheeting. As gauges go down, due to the small area of the die opening, temperatures rise progressively. Many present day stocks cannot tolerate this condition. I would suggest a gauge with a break point of ⅛-inch or .0125-inch. With inner tubes, it is approximately .060-inch. Considering the circumference of these tubes the width is narrower than we ordinarily expect in sheeting stock. The range between .060 and .0125-inch may well be debatable, and above the .0125-inch gauge increasingly interesting.

The advantages I might list include the following: In that range, where it is successful, there is a lower capital expense, generally, with a tuber as compared to a calender. Generally there is a lower operating expense, particularly as compared with those sheetings requiring multiple build-up. One of the greater advantages is freedom from blistering on the tuber and, of course, that is the primary reason for a multiple build-up on the calender. On the other hand, there is a tendency toward higher operating temperatures on the extruder. There is also a tendency to somewhat rougher surfaces from the tuber than there is on a calender. The usual procedure is to extrude through a round die which gives a small compact head and therefore eliminates most of the stresses in the sheet. The split is made at the die. There aren't too many extruders in use for this particular purpose, but there is considerable activity in this field. I rather suspect an increase in use of that type of equipment.

**Question**—What are the relative merits and disadvantages of extruding two piece "cap and base" treads by (1) two tubers in tandem with tread laid up continuously on a belt and (2) two tubers with dual head and common die?

***Answered by Mr. Bruggemeier:*** From the information I have been able to gather there are apparently no merits to tandem operations. Disadvantages are that there is a tendency toward tread cracking in the finished tire. Also, when working-away off gauge, and off tread weights, the sidewall stock is introduced in the tread stock. The general practice and trend is toward dual operation. With dual operation, a very uniform bond between the sidewall and the tread is derived. Possible disadvantages are higher operating temperatures. Then there is the usual trouble with differential shrinkage of the sidewall and the tread which gives some operating difficulties.

**Question**—What extruder designs are best suited for the various rubbers?

***Answered by Mr. Heston:*** I would not undertake to recommend any specific screw for any specific so-called rubber until I had some information on its extrusion characteristics. However, we have pretty generally settled on two types of screws that cover better than 80% in the field, at least as far as tires and inner tubes are concerned. First is the single flight screw with a double tip at the end, used in either variable or uniform pitch. To compensate for the added compression due to the balancing flight introduced at the discharge end, the root diameter of screw is sometimes tapered. The double flight at tip helps to distribute and overcome the pulsation that might otherwise show in the extrusion from the die.

The other type of screw that holds second place in popularity for tire and tube stocks is the double pitched screw, slightly decreasing. Here trouble may develop if the compression ratio in the screw, i.e., the decreasing pitch, is not carefully selected with respect to the material being handled. Perhaps we have learned a bit more in handling thermoplastics than we have so-called rubbers. It is understood, of course, that the compressability of rubber used in most of the tire and tube stocks is comparatively small. Therefore, with a decreasing pitch, heat may be created that is not tolerable to the compound.

**Question**—What method of stock control is best suited to the maintenance of good extruding characteristics? Mooney Viscometer?

***Answered by Mr. Beebe:*** Fundamentally there are three problems in mill room control. First, there is the problem of scorch. Control of that may be pretty well maintained by modulus testing in the mill room control laboratory. The second problem is one of contour. Here, the use of the plastometer is advantageous and for this purpose it makes no difference to me whether it is a Williams, a Mooney, a Scott, or what have you. In fact, to be perfectly honest, I do not believe there is much association between plasticity and tubing characteristics. Therefore, this test, and in fact the modulus test, are specific to a given compound. There will be as many standards in the laboratory as there are compounds on the line. What is accomplished is that the mill room is under control, and if we can do that we insure pretty uniform stock at the conclusion of the mixing procedures. The testing procedures may be more or less unrelated to the tubing characteristics. The principal reason is to keep the mill room under control.

Let us leave control testing for just a moment. There is one gadget that really clicks for development work. That is a simple two-inch extruder that is used in the laboratory. On that little machine, scorch, swelling, smoothness, coherence, etc., may be determined. Garvey, Whitlock and Freese wrote this up in *Industrial and Chemical Engineering* back in 1942. This method is too

slow for the mill rooms and is purely a device that should and can be used very well by the development men in the original development of the formula.

However, suppose we have a mill room under control? So what? The whole extrusion procedure can be fouled up faster on warm-up and feed mills than at any other point. Unless the tuber is fed absolutely uniform, i.e., uniform weight per unit length, the extruded strips will vary, irrespective of stock and of the control that is placed on it. Erratic scrap usage works in the same direction. Mill rooms can be kept under control. The biggest problem, however, is keeping warm-up mills, scrap, etc., under control if uniformity is ever to be gained in extrusion.

**Question**—What is the best method or methods of controlling the die speed of extrusions with variable cross section side to side to overcome uneven stress?

***Answered by Mr. Fay:*** I believe the extrusion of a tire tread would suit this question. It has the variables in cross section contour included in the question. Mr. Heston, in an answer to an earlier question, covered several very important factors which also apply to this question. These are:

(1) The design of the die head: (a) Proportioning the cavity to maintain balanced pressure to the finishing die; (b) Shortest possible distance between the end of the screw and discharge point at finishing die, consistent with cavity width; (c) Unobstructed flow, including highly polished cavity.

(2) Temperature of die head and finishing die. Means should be designed in the head to allow for temperature control of the sidewall section independent of the center. Sidewall cavities should be kept at much higher temperatures than the center. Means should also be provided to keep the finishing plate die up to required temperature either by use of steam or electricity. I do not recommend gas.

(3) The finishing die plate should be carefully designed to allow only a sufficient pull to take the stock from the tuber to conveyor. This stretch should not exceed 3%. It is preferable if kept between 1 and 2%.

(4) There should be proper compounding, sufficient milling and warming of stock.

(5) Tubers of more than sufficient capacity should be provided. These should be able to operate at moderate screw speeds and low extrusion temperatures.

(6) Continuous and uniform feed with minimum temperature variation.

Some of these requirements are not readily obtained with the single screw extrusion unit. Multiple screw extrusion units allow more leeway in that the sidewall section is entirely independent up to the point of entry into the compound shaping die, both for screw speed and temperature control.

However, because of the large range of shapes which extruders are generally required to produce, it is doubtful if a die head could be designed to successfully extrude all shapes, sizes and widths at the same extrusion speed across the face of the die. The best that can be done is to minimize rather than eliminate stretch in the thin sections, usually the sidewalls.

**Question**—What combination of screw design, die design and feed control is best for obtaining a dense or porous free extrusion?

***Answered by Mr. Beebe:*** My experience only covers the tire end of the industry, although I believe there is a basic principle involved that should apply whether it is mechanical goods or tires. That principle is that any combination of equipment design and/or formulation which will produce a lower extrusion temperature, will increase stock density. Considering the extruder only, any equipment combination that will increase the output of the screw per rpm will lower extrusion temperature proportionately.

Before continuing on the extruder, let us consider the operator. The average operator will "starve" a screw at least by 33⅓% and never bat an eye. If the feed strip is increased up to the choke point the temperature will be decreased. If the operator problem is overcome the first step in accomplishing denser treads has been taken.

In my experience a single screw will give a decided advantage, or to put it better, a decided increase in output per rpm and, therefore, lower temperatures. Of even greater importance is the use of a proper feed box design. I have seen output per rpm raised as much as 50% by purely a feed box design change. Along the same line it would naturally follow that the use of a roller feed might be very applicable to increased output, lower temperature, and denser stock.

It should be remembered that these observations are applicable to the same rpm. Therefore, if this is followed as the output per rpm is increased, the gross output of the extruder will be increased. On the other hand, if the present gross output is satisfactory then rpm can likewise be decreased in proportion and a still further decrease in temperature will be obtained. Roughly speaking, the extrusion temperature will change about 1° per rpm of the screw.

One other method that is frequently effective is cooling down the end of the screw. In other words, a good way to make blisters is to have a hot screw, and the simple device of drilling or increasing the cavity of the hose makes an amazingly significant difference. Cooled screws may also be very applicable.

**Question**—What combination of screw design and die design is best in the handling of cold feed stock?

***Answered by Mr. Fay:*** My experience in handling cold feed stock is limited to bead wire covering stock. The feed stock is extruded in round form about ½-inch in diameter, cooled by immersion in running water, passes through a soap solution to prevent sticking, and allowed to coil naturally in 55 gal. cans. This cold stock is then fed into the wire covering extruder which is a 2½-inch National Rubber Extruder, single lead screw. This tuber feeds itself by pulling two or more strands of the cold round feed stock into the feed box, thus providing a constant uniform feed. Temperatures are manually controlled on both tuber and die head.

About the middle thirties, we experimented with a machine designed by the Farrel-Birmingham Co., a 6-inch warmer-extruder. It was a two-stage machine, the first stage designed along the lines of a plasticator and the second a regular double lead tuber screw. We first experimented with white sidewall stock. There was immediate evidence of insufficient breakdown because there was a periodic discharge of distorted gobs of cold stock which occurred about every ten feet in the extruded section. We then tried our regular black tread stock and the machine jammed, so it was returned to Farrel-Birmingham. Even though cold feed stock is to be used, it should be kept in mind that the temperature must be raised to 200° or 220° F. for good extrusion.

**Question**—What general methods are employed for preventing the collapse of gum tubing during the extrusion operation?

***Answered by Mr. Heston:*** I suspect that question is in reference to thin wall tubes. I do not believe that it was intended to apply to inner tubes which are commonly permitted to flatten, nor to the heavier wall small tubing. In extruding thin walls perhaps the easiest way to maintain the section until sufficient cooling takes place, is to introduce a supply of air, i.e., air pressure through the end or mandrel with or without soapstone. This is a rather expensive way of maintaining the diameter of the tubing, in that compressed air is costly.

There is an ingenious method in use in the extrusion of thermoplastic tubing. I refer to a recent patent issued to Charles Slaughter of Extruded Plastics, Inc., Norwalk, Conn. What he has done is to provide means to support within the tube, a slug or stopper, torpedo-shaped, streamlined, but filling close enough to the I.D. of the tube to maintain very low air pressure until such time as the tube is cooled sufficiently to support its own weight.

**Question**—What is being done to develop adjustable dies for camelback and tread extruders? What are the limits of size which can be run from an extruder without changing the die?

***Answered by Mr. Phillips:*** The first part of that question pertains to camelback dies. There may be adjustable dies, but I have never seen one. There is a great deal of work being done now using a wide slab for the biggest size to be run in a given group of sizes, then trimming them to the size desired. In other words, several code numbers may be run, several die sizes from the same die, by trimming to width. The same type of operation also permits the changing of the gauge by limited amounts.

As for the second part of the question: There are a lot of engineers who will like my answers and a lot of production men who will not. My answer is one in each case. I realize that more can be run from the extruder, and I have seen two, three, four, five or more inner tubes on the same die. I have seen two or three sizes of camelback out of the same die with poor quality and variable weights and variable specifications, etc. The best tread, water bags and allied articles will be achieved if production is confined to one size and to one size of die.

**Question**—What is being done about strip feeding an extruder without the use of a mill?

***Answered by Mr. Heston:*** The question as I understand it is: What is being done in feeding tubers without a warming mill, and would such operations be successful? We find a number of plants which do not have warm stock, or do not have mills. We also have departments in large plants in which it is highly undesirable to install a mill, where it is necessary to extrude stock. Recently, as was previously explained, we have developed a tuber that may be fed with cold stock. We do not claim that we are getting something for nothing in feeding the tuber with a cold stock. We have tried some of the tough tread compounds and other synthetics that are a bit difficult to run, and are extruding them through rather intricate dies from cold feed. The next size larger machine for the same production should be selected. Slightly more horsepower will be required than for regular extrusion with warm feed stock. It will not equal the amount of power required in a two-unit drive such as on the warming mill and on the warm feed extruder, each with individual drive.

**Question**—What relation has speed, in feet per minute, between extruder screw and the mill strip feeding roll?

***Answered by Mr. Fay:*** There is a very broad relationship between the extruder screw speed and the feed mill roll speed. I have very concrete evidence of that. In our Detroit plant, we are operating a number of identical extruding units with feed mills of different speeds and getting the same production with the same extruder screw speeds as follow:

| *Speed of Feed Mill Delivery Roll* | *Speed of Extruder Screw* |
|---|---|
| 73 fpm | 36 rpm |
| 81 fpm | 36 rpm |
| 92 fpm | 36 rpm |
| 100 fpm | 36 rpm |

The governing factor of the extruder screw speed is the volume of the feed in pounds per minute. It is quite important to use extruders of sufficient capacity since they can be operated at relatively slow screw speeds.

The danger of using small extruders lies in the fact that they must be operated at very high screw speeds in order to take the feed stock from the mill, thus creating high temperatures, exposure to scorched stock, cured stock in the die head, and creating a handling problem of the extruded stock. It also limits the versatility of the extruder.

There are, no doubt, limits below and above those quoted which would cause trouble, but I believe the wide range of feed mill speeds currently in use would indicate the absence of a problem generally in mill to extruder operation.

**Question**—What advantage can be gained by the use of: shallow extruder screw; single lead extruder screw; double lead extruder screw; variable pitch extruder screw? If the double pitch extruder screw is used, should it be double pitch in the feed box area?

***Answered by Mr. Heston:*** The shallow extruder screw became most popular with the advent of GR-S. We found that by reducing the flight depth approximately 30%, that is, 30% from the full depth of flight, we suffered little loss in production. We did obtain some improvements in extrusion, particularly in the temperature.

As for single lead or double lead, which is controversial, I believe we should also add the factor of variable pitch. Mr. Beebe gave some of his ideas on the subject earlier, and I touched on it in earlier comments. I certainly won't undertake in the short time allotted here to analyze the subject. However, as to the double pitch extruder screw having its flights continue into the feed hopper, I would certainly recommend this for uniformity of discharge at the die and to avoid pulsations. It is necessary to carry both flights through to the feed hopper so as to assure that each revolution of the screw loads each flight, i.e., stuffs the cylinder uniformly with each revolution.

It is problematical how far one can go in cutting away that one flight and be able to equally distribute the load between flights. By how far, I mean the distance from the feed hopper to the second flight. I realize that this is not a complete answer to the question; rather, it is a reply.

**Question**—What is the best method of controlling extruding die swell or shrinkback on pans, especially of high grade stocks, so size can be maintained?

*(Continued on page 66)*

# Carbon Black Gel as a Factor in Natural Rubber Reinforcement

By H. A. BRAENDLE, R. K. ESTELOW, and W. B. WIEGAND

*Research Laboratories, Columbian Carbon Co., New York 17, N. Y.*

ABOUT 1904 *(1)* carbon black was first evaluated in rubber for properties other than coloring. Its use as a reinforcing pigment in tire treads followed in 1910 *(2)*. The superiority of carbon black as a reinforcing pigment was shown in 1920 *(3)* to be due largely to extreme fineness of subdivision. The colloidal dimensions of carbon black were thoroughly established by various means, notably the painstaking work of Gehman and Morris *(4)* with the ultramicroscope. Other properties were later discovered and investigated, such as volatile content *(5)* and pH *(6)*.

Through the use of the electron microscope *(7, 8)* the colloidal nature of the whole family of carbon blacks was put on a quantitative basis. There followed the recognition of three fundamental properties of carbon black —surface, pH and structure *(9, 10)*. The quantitative determination of specific surface revealed behavior anomalies leading to the concept of reticulate chain structure. Similarly, the closer study of the three fundamentals is revealing further anomalies. One of these receiving attention is roughness factor *(11)*. Still other unexpected behaviors have been revealed as will be shown.

## Carbon Gel in Cold Rubber

In 1949 the Research Laboratories of Columbian Carbon Company *(12, 13, 14)* showed that there was a new reinforcing element in cold rubber treads, viz., the carbon gel complex. This concept evolved out of "bound rubber" studies. It was shown that the carbon gel effect had a positive temperature coefficient. The recognition of this fact made it possible to control its formation through choice of carbon and processing temperatures and, through these, modulus, abrasion resistance and flex, i.e., tire life.

In recent months it has been found that carbon gel plays an almost identical role in Hevea tire tread processing and performance. In the case of cold rubber two factors, choice of carbon and mixing temperatures, were the prime variables. For natural rubber it seems that an extra step is required for controlled formation of the carbon gel complex.

* Statex K.

TABLE II—HEVEA GEL VS. CARBON

| | Lab. Banbury Mixed | | | |
|---|---|---|---|---|
| | 50 phr. EPC | | 50 phr. VFF | |
| | No Gel Step 270° F. Max. | 75% MB to 375° F. | No Gel Step 260° F. Max. | 75% MB to 390° F. |
| L-300 (30'/280° F.) | 1190 | 1880 | 1520 | 1980 |
| Tensile (30'/280° F.) | 4050 | 3620 | 3780 | 3880 |
| % Elong. (30'/280° F.) | 645 | 475 | 580 | 520 |
| DeMattia Flex (45'/280—Pierced Groove, Kc. to Failure) | 53 | 95 | 77 | 211 |

## Carbon Gel in Hevea

The data of Table I show that hot mixing alone gives only a moderate increase in modulus. This had already been shown by Drogin et al *(15)*. Likewise, the preparation of a stiff masterbatch of rubber, carbon and pine tar in a cold Banbury followed by dilution to a final tread formula gave little modulus effect. But when a high black-high temperature Banbury mixed masterbatch was prepared (Hevea, 100; VFF*, 80; pine tar, 6; mixed to a temperature of 370° F.), a 600-pound increase in modulus resulted. That this was a carbon gel effect was further evidenced by the fact that just as in LTP, tensile strength was maintained, rebound increased markedly and abrasion resistance was sharply up.

[N.B.—In this entire study the laboratory compounds were all prepared in the Banbury using temperatures and

TABLE I—VFF-HEVEA GEL

| | Lab. Banbury Mixed | | | | |
|---|---|---|---|---|---|
| | EPC Reg. Mix No Gel Step 250° F. Max. | VFF Reg. Mix No Gel Step 250° F. Max. | VFF Hot Mix 325° F. | VFF 80% M.B. Cold Mix | VFF 80% M.B. Hot Mix 370° F. |
| Opt. Cure @ 274° F. | 35' | 20' | 20' | 20' | 25' |
| L-300 | 850 | 1100 | 1175 | 1150 | 1775 |
| Tensile | 4300 | 4100 | 4025 | 4150 | 4100 |
| % Elongation | 710 | 685 | 665 | 680 | 580 |
| Shore Hardness | 54 | 54 | 58 | 55 | 56 |
| Log R | 8.0 | 3.0 | 3.0 | 3.5 | 3.6 |
| % Rebound | 67.5 | 66 | 68.4 | 69.6 | 71.5 |
| Abrasion Resistance | 100 | 111 | | | 133 |

TABLE III—VFF-HEVEA GEL

(% Carbon in Masterbatch)

| | Lab. Banbury Mixed | | |
|---|---|---|---|
| | VFF 80% MB (80 phr.) Max. Temp. 390° F. | VFF 75% MB Max. Temp. 390° F. | VFF 70% MB Max. Temp. 390° F. |
| Opt. Cure @ 274° F. | 25' | 25' | 25' |
| L-300 | 1800 | 1875 | 1550 |
| Tensile | 4150 | 4050 | 4000 |
| % Elongation | 585 | 540 | 610 |
| Shore Hardness | 56 | 56 | 57 |
| Log R | 3.9 | 4.5 | 3.4 |
| % Rebound | 75.1 | 74.7 | 73.4 |

times closely simulating those common in factory practice *(16)*].

### Effect of Carbon and Other Variables

This effect is not confined to VFF carbon alone. EPC responds similarly but with important differences, as shown in Table II. The EPC tread showed an even greater increase in modulus than the VFF compound but at a serious loss in tensile and elongation. The De-Mattia flex life of the VFF tread was also significantly superior.

Looking forward to factory application of this new principle, it was necessary to know how much black was needed in the masterbatch to produce this gel effect. Table III shows that with pine tar as the softener about 75 phr. of VFF carbon is needed to produce the full gel effect. Work in the factory has shown that when FF carbon is used the black loading should be kept at 80%.

In Figure 1 two variables are recorded, viz., temperature of the masterbatch mix and type of carbon. It is noted that for both EPC and VFF carbon the temperature coefficient of gel formation, as shown by modulus rise, is greater than for HAF carbon although the absolute values for the HAF are the highest. Of even greater interest is the tensile and elongation picture. VFF alone holds its tensile as gel is formed; the other two carbons lose tensile. This, combined with the increase in modulus, exacts a serious penalty in elongation for these carbons.

Since the handling of masterbatches of the concentration recommended here sometimes causes concern, it seemed desirable to put the batch back into the Banbury for the diluting step while it was still warm and therefore relatively soft, a step which in addition to being easier on the equipment would also represent a power saving. In Table IV it is shown that the carbon gel effect is not dependent on any set-up or recovery of rubber nerve but that the gel is formed in the Banbury. Of interest also is the fact that the per cent rubber insolubilized, or gelled, rose.

### Carbon-Hevea Gel in the Factory and on the Road

The carbon-Hevea gel effect has been reproduced repeatedly in the factory on full scale operation. (N.B.—In the factory Banbury it is advisable to include the major part of the softener with the carbon in the original masterbatch). An example is shown in Table V. The physical properties shown are those of the extruded tread stocks.

The cold rubber tread control, as is indicated, was made by the recommended LTP gel method *(12, 13)* and a comparison of the first two columns shows that it has now been possible to produce a natural rubber tread with better modulus as well as tensile than an equivalent LPT tread. This is true even where a slightly higher ratio of FF carbon is employed. Running at 60 mph. on a test course in Southwest Texas, the VFF-Hevea gel tires are outwearing the cold rubber-VFF tires.

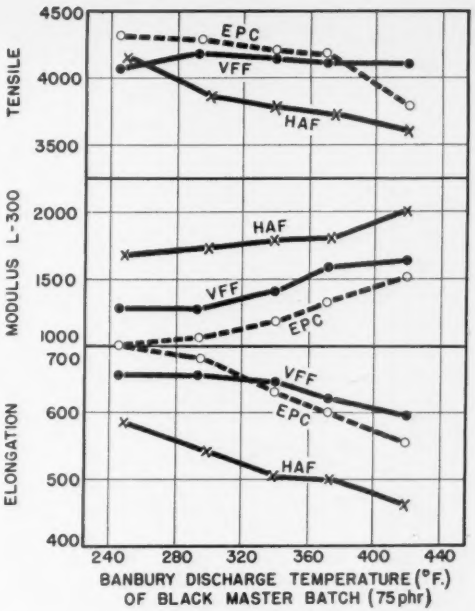


*FIG. 1—Effect of masterbatch temperature and type of carbon black in Hevea gel.*

### Summary

(1) A carbon black-natural rubber gel effect as a factor in reinforcement has been established.

(2) A high (75-80%) carbon to rubber masterbatch mixed at 350-380° F. is required to produce the enhanced physical properties associated with the gel effect.

TABLE IV—VFF-HEVEA GEL

(Effect of Rest Period, Masterbatch to Final)

| | Control No Gel Step | Lab. Banbury Mixed 75% phr. VFF MB Rest Period MB to Dilution Varied 5 Min. | 30 Min. | 2 Hrs. | 24 Hrs. |
|---|---|---|---|---|---|
| L-300 (60'/274° F.) | 1400 | 1950 | 1920 | 1850 | 1900 |
| Tensile (60'/274° F.) | 4300 | 4420 | 4400 | 4300 | 4380 |
| % Elongation (60'/274° F.) | 635 | 565 | 570 | 565 | 570 |
| Shore Hardness (60'/274° F.) | 59 | 59 | 57 | 58 | 58 |
| Log R | 2.9 | 3.6 | 3.6 | 3.5 | 3.5 |
| % Rebound | 67.8 | 74.6 | 74.0 | 73.5 | 72.9 |
| Rebound Indentation (60'/274° F.) | .235 | .253 | .253 | .252 | .253 |
| % Rubber Insolubilized | 16.6 | 24.3 | 26.3 | 25.1 | 23.9 |

TABLE V—CARBON-HEVEA GEL IN THE FACTORY

| Tread Type | Cold Rubber | Hevea Gel | |
|---|---|---|---|
| Composition of Blackmaster | | 75% VFF | 80% FF |
| Smoked Sheets | | 100 | 100 |
| Carbon | | 75 | 80 |
| Pine Tar | | 7.5 | 5.82 |
| Total | | 182.5 | 185.82 |
| Factory Processing | | | |
| Blackmaster—40 rpm—No. 11 Banbury | None | as above | |
| Discharge temp. °F. | | 375° | 380° |
| Mix to Final Black Ratio | | 50 VFF | 55 FF |
| Discharge Temp. °F.—40 rpm—No. 11 Banbury | 385° | 300° | 305° |
| Finishing—20 rpm—No. 11 Banbury | 290° | 273° | 268° |
| Extrusion | | | |
| Final Stock Temp. °F. of Tread | 278° | 255° | 260° |
| Mooney Viscosity ML-4' @ 212° F. | 65.5 | 60.5 | 64.5 |
| Mooney Scorch @ 250° F. | 51' | 22.5' | 22.5' |
| Physicals of Extruded Treads | | | |
| Cure at 280° F. | 60' | 60' | 60' |
| Modulus at 300% (p.s.i.) | 1590 | 1900 | 2000 |
| Tensile (p.s.i.) | 3525 | 4100 | 3900 |
| Elongation (%) | 545 | 560 | 530 |
| Shore Hardness (Type A) | 57 | 64 | 66 |
| Log R | 5.2 | 3.7 | 3.3 |

(3) Neither hot mixing alone nor masterbatching at cool temperatures alone gives the gel effect.

(4) Softener (e.g., pine tar) is necessary in the masterbatch to avoid excessive heat build-up and possible ignition on discharge from a factory Banbury.

(5) The relatively soft warm masterbatch may be diluted with added rubber at once since the gel effect occurs during hot masterbatching.

(6) The gel effect is obtainable with channel black, oil type HAF carbon or VFF carbon.

(7) VFF carbon has an advantage over the other two types in that improvement in modulus, resilience and abrasion resistance is obtained without loss of tensile or flex life.

(8) The improvement in modulus obtained through the gel effect in natural rubber has been translated into improved road wear.

(9) In an eight-tire (6.50) road test in Southwest Texas, VFF-Hevea gel treads outwore VFF-LTP gel treads by 5%.

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## Heat Stability of Pliovic Films and Sheeting

HEAT stability of films and sheeting processed from Pliovic vinyl resins was a feature of the exhibit of the Chemical Division of the Goodyear Tire & Rubber Co. at the recent exposition of the Society of Plastics Industries in Chicago. Goodyear demonstrated low temperature runs of "dead white" sheeting—an initial run, first re-run and second re-run—to show the excellent color retention of the material when passing through normal but repeated processing operations.

To the film manufacturer such heat stability and color retention characteristics mean that scrap ends of runs or trimmings of the original can be safely incorporated into first run material without impairing the color or quality of the product and also that off-gauge material of "dead white" color can be re-run to the proper gauge without color drift. This is said to be due to the inherent low temperature processing characteristics and good stability of the resin itself.

In the demonstrated production runs, three batches of approximately 125 pounds each were prepared. Half-batch lots of 65 pounds each were pre-mixed in a conventional mixer with plasticizers added in one minute at slow speed, after which the mixture was blended for five minutes at high speed agitation. Following this pre-mixing operation each batch was transferred to a Banbury set at 300° F., with the temperature then elevated to 325° F., which usually requires about three minutes.

Next step was a "blender" mill operation at 260° F. The stock was cut and rolled three times and then started on a conveyor belt to a warm-up mill. This mill was set at 300° F. Stock was automatically cut and fed back into the rolling bank, then stripped and conveyed to the calender. The four calender rolls carried the following temperatures: offset roll, 305° F.; top roll, 335° F.; center roll, 335° F., and bottom roll, 325° F. The stock was calendered at the rate of 22 yards a minute and automatically wound.

The second batch, or the first re-run, was subjected to the same procedure, following which the calendered sheet was cooled, returned to the Banbury, re-mixed, re-milled and re-calendered under the same conditions. The third batch was subjected to still another re-run, making a total of initial run and two re-runs, under the same identical conditions.

At the end of the runs, despite the fact that no special precautions were taken to avoid contamination, and the normal production procedure was not altered to give more favorable conditions, the color change on the two complete reprocessings was practically invisible to the eye.

## Panel Discussion on Rubber Equipment

*(Continued from Page 63)*

***Answered by Mr. Phillips:*** Frankly, I think that the subject of shrinkage as it pertains to tubes, treads, and other allied extruded products is kicked around quite a bit. In my mind, many operators in a great many plants stretch their extruded article entirely too much as it comes from the die and then wonder why they have shrinkage or recovery as and after the product leaves the extrusion unit.

In my opinion, more and better extruded articles will be made by coming as close as possible to following the push principle rather than the pull or stretch principle. The best treads I have ever seen run, and to very precise specifications adding to very uniform finished tires were treads that were awfully close to the required dimensions as they left the die of the extruding machine.

## Rubber Manufacturing Activities in Various Countries

ADDITIONAL data on the rubber manufacturing activities of various foreign countries, as recently reported by the U. S. Department of Commerce, is presented below:

*Netherlands:* Production of automobile and truck tire casings in the Netherlands in 1949 was estimated at 250,000 units of which output in the last 6 months amounted to 150,000. Automobile and truck tube output was estimated at approximately 225,000. Passenger-car casings manufactured in the Netherlands range in size from 4.50 x 17 to 7 x 16, and truck and bus tires range from 6 x 20, 8-ply, to 12 x 20, 14-ply. Tractor and implement tires are not being produced, although plans to make them are being drawn up. Production of bicycle casings and tubes dropped sharply in 1949 from 1948. Last year approximately 4,500,000 casings were produced, compared with 5,984,000 in 1948. Output of tubes declined even more, totaling about 2,600,000 units compared with 6,073,000 in 1948.

*Ireland:* Except for the manufacture of rubberized overcoats carried on by 20 firms in Ireland, rubber products manufactured in that country are virtually all made by one company. The articles it produces include automobile, truck, bus, and cycle tires and tubes, golf, tennis, and play balls, rubber footwear, hot water bottles, and rubber cushions and mattresses. Importation of these items is restricted by quotas and high tariffs. The dollar shortage and exchange difficulties present further obstacles to imports from the United States. None of the raw materials used in the manufacture of rubber products are available in Ireland. The chief sources of raw rubber are Malaya and Ceylon from which areas, in 1948, Ireland took 48,986 hundredweight and 4,656 hundredweight, respectively. (1 hundredweight = 112 pounds.)

*Argentina:* Four tire factories were operating in Argentina in 1949, and another was scheduled to be completed early in 1950. Tire production amounted to 844,000 units in 1948, but raw material difficulties caused a decline to 685,000 units for the first 10 months of 1949. In addition to tires and tubes for most types of conveyances, the domestic industry also produces a wide range of other rubber products, meeting about 70 percent of normal demand.

*Italy:* Consumption of natural rubber in 1949 totaled 31,000 metric tons, a slight increase over 1948. At the close of the year rising prices for imported rubber nullified the initial effects of devaluation. The output of rubber products improved in 1949 so that it totaled an estimated 65,000 metric tons, or well above that in 1947 and 1948, as well as in 1938. Exports of tires and tubes amounting to 7,000 tons were only slightly below those of 1948.

*Cuba:* Production of truck and bus tires and tubes in the first 6 months of 1949 decreased considerably in comparison with the corresponding period of 1948. Production of tires in the first 6 months of 1949 was 14,153 units; in the same period of 1948, output was 27,958 units. The output of tubes dropped to 5,400 in the first 6 months of 1949 from 17,674 in January-June 1948. Production of passenger-car tires in the first half of 1949 was 8,559 compared with 15,564 in the first half of 1948. The output of tubes, however, was 8,160 in the first half of 1949 compared with 6,857 in the same period of 1948. In the first part of this year domestic manufacturers, distributors, and retailers undertook to reduce excessive inventories of tires and tubes. This reduction in tire and tube stocks apparently is continuing.

## Production of Powdered Rubber in Malaya

THE Director of the Malayan Rubber Research Institute, in a recent press release, stated that the Institute was working on the preparation of special rubbers, including rubber powders, as part of its 5-year research program. He stated that negotiations were under way with the Dutch Government for permission to manufacture the powdered rubber, "Mealorub," first made by the Dutch and used in rubber-roads trials in the United States.

Under an agreement among British, Dutch, and French producers, the field for research and development of new uses for rubber has been apportioned in the three countries in order to avoid waste of effort. Before the agreement, Dutch chemists had done much research on the preparation of rubber powder, and further work was allotted to them. Rubber research sources indicate that a patent-pooling arrangement operated by the International Rubber Development Committee will be worked out in the use of the "Mealorub" process.

The Director of the Rubber Research Institute, on receiving estimates from the United States placing the demand for road-surfacing rubber at 100,000 to 200,000 tons annually within 5 years, was quite optimistic although cautious in accepting the full implications. If such a demand develops, every effort will be made to expand production. In accordance with the usual procedure under the International Rubber Development Committee, the Dutch will permit the manufacture of material under license in other producing territories including Malaya. The Rubber Research Institute of Malaya is also investigating alternative methods of preparing rubber powder. A powder has been prepared from skim latex, which until recently has been a troublesome waste product from the preparation of latex concentration.

A plant capable of producing 50 tons of powdered rubber a month, with a potential of several times that amount if the demand so warrants, is being built at Singapore. The managing director stated that full commercial production would commence soon. He also stated that the only other place where powdered rubber is being produced is the pilot experimental station at Buitenzorg in Indonesia. A larger plant is reportedly being built on a Government estate in Indonesia.

# The Manufacture of Miniature Fashion Mannequins from Rubber Latex

By HUGH J. JARMAN

THE manufacture of miniature fashion mannequins from rubber latex presents many problems not generally encountered in the production of plaster or plastic types. Because the average life of the latex mannequins is about 10 years and the need for replacements is few and far between, there is a great demand for mannequins of this type. Although the production of miniature mannequins from latex is quite similar to that of regular size store and window figures, it is an art in itself.

In the ordinary manufacture of mannequins, two half molds are used. These are lined with a thin plaster paste or some other type of plastic composition, followed by a layer of paper or burlap or some other fabric, then more plaster, and finally the two halves are joined. The combined mold is then set aside until the two halves are completely adhered and become semi-dry. They are then taken from the mold and placed into a drying oven.

When making miniature latex mannequins the process is far more intricate. Although various procedures are used by different manufacturers the process used by the Rubber Guild at its plant at 461 Mayer Street in Montreal, Canada, has proved most satisfactory and the company has enjoyed substantial business for many years. The author is indebted to the Rubber Guild for the method to be discussed.

## Production Techniques

The first problem to be considered in the manufacture of mannequins from latex is that of shrinkage. Since the mannequins are intended for the display of articles of clothing, exact reductions must be produced. The design of the master mold must take into consideration the amount of shrinkage which will result as working molds are reproduced. The working mold, in turn, must be exactly in between the size of the master mold and the required size of the mannequin, sometimes as small as ⅛ life-size. Figure 1 illustrates the degree of shrinkage between a head cast from a master mold and one cast from a working mold.

After the working molds have been completed and checked for accuracy, they are ready for the production of the mannequins. In the first step of the process the operator turns the working mold upside down and pours a latex solution into its hollow bottom (Figure 2). The filled molds are then placed into a primary drying oven where a constant low temperature is maintained. This stage of the operation is not intended to cure the rubber but, rather, to allow a coating of a predetermined thickness to be formed around the inside of the mold.

At the conclusion of a proper interval the mold is removed from the oven and turned right-side-up so that the rubber solution which has not been solidified can drain off into a container. During the primary drying period, a semi-cured film of rubber approximately 3/16 inch thick has been formed. When the excess latex has been drained off, the mold is placed into a secondary drying chamber for another predetermined drying period.

Upon leaving the secondary drying chamber the semi-cured miniature mannequin is removed from the mold

*FIG. 1—These heads from the master mold and working mold indicate the shrinkage involved.*

*FIG. 2—Pouring latex into the hollow bottom of the working mold after it has been turned upside down.*

*FIG. 3—After secondary drying the mannequin is removed by parting the mold down the center.*

*FIG. 4—The pliable mannequins are placed in rows in large ovens for the final curing operation.*

by parting the mold down the center (Figure 3). As each half of the mannequin becomes exposed to the air and while it is still warm the operator gives it a coating of a coloring solution. At this point the mannequins are still pliable. At the next step they are placed in rows and inserted into the final drying or curing chamber as shown in Figure 4.

During the final slow drying process the mannequin becomes hard, but not brittle. When the mannequin has been removed from the drying oven it is inspected, the inspector marking flaws in the newly-cured mannequins. If the flaws are of major importance and not repairable the rejected item is a complete loss for it cannot be remelted or salvaged.

Once the mannequin has passed inspection it goes to a mechanical sanding department where operators using motor-powered sanders expertly remove all the rough spots. Figure 5 shows an operator removing some of the rough spots caused by a leakage in the joints of the mold. The mannequins are then again

*FIG. 5—Operators remove some of the rough spots from the mannequins on automatic sanding units.*

*FIG. 6—Special attention is paid to facial contour, bust lines, construction details, etc.*

*FIG. 7—Hand sanders are used to provide perfect curvatures on mannequins of the type shown.*

*FIG. 8—The finished mannequins are given a coat of transparent lacquer for high luster.*

routed through the inspection department for another check.

At the conclusion of this second inspection, the mannequins pass on to expert hand sanding operators. During this phase of manufacture the mannequins receive their final smooth finish. Attention is paid to facial contour and construction, lines of the bust, etc. (Figure 6). Figure 7 illustrates a sanding operation on a mannequin designed to model brassieres. Since the mannequins often require a perfectly level base for display purposes, great attention is paid to this phase of manufacture.

Most companies order mannequins which call for a raised letter trade name on the base. In this case, each letter is clear cut and carefully gilded. As soon as this is complete the mannequins are passed to the lacquer department where they are sprayed with a transparent lacquer. This gives a high luster to the finished product, as shown in Figure 8. Following a final inspection the mannequins are wrapped and sealed in individual cellophane bags and corrugated shipping cartons.

The Rubber Guild was founded in 1936 by Charles H. Kirchkoff and William Hovermann, both natives of Germany. Both founders, now Canadian citizens, are graduates of the Beaux Arts School in Montreal and are noted sculptors in their own right. The company has built up sales representation throughout Canada, with each sales representative pledged against price cutting. In addition to miniature mannequins, the company does a large business in trade-mark plaques for a number of nationally-known firms.

The latest product of the Rubber Guild is a pliable rubber wig which fits onto the head of any mannequin or millinery display piece regardless of size. These rubber wigs are reported to have a number of advantages over hair wigs. They fit the head closely and do not show a hair line. They do not become damaged if roughly handled or dropped. And they are sold at lower prices.

The Rubber Guild will mold practically any item in the display line on order, including men's and ladies' heads for hats and millinery, hands for displaying gloves and jewelry, and plaques of any size, shape or description. The company is especially proud of the fact that practically every large corset company in Canada is using its miniature latex mannequins.

## Improved Butyl Polymer Eliminates Buckling in Tubes

SEVERAL years ago it was determined that butyl inner tubes used in sub-zero temperatures often formed longitudinal folds or "buckles" which caused tires to go flat by chafing through at the creases. Research was immediately launched to overcome this defect and today improved butyl inner tubes are serving as well in sub-zero cold as in moderate climates.

The research investigation undertaken and the results achieved were outlined in a paper by Dr. D. J. Buckley, E. T. Marshall and H. H. Vickers, of the Esso Laboratories, Standard Oil Development Co., Linden, N. J., at the symposium on "Chemicals from Petroleum" which was a feature of the 117th National Meeting of the American Chemical Society held at Houston, Texas, on March 29, 1950.

According to the paper, it was demonstrated experimentally that buckling occurs only within the first minute of operation of the tire in sub-zero service. After the first few revolutions of the wheel, sufficient heat is generated in the tire to raise the temperature of the tube above the buckling level.

Even though it appeared that buckling in inner tubes might be prevented by a light coating of soap solution on the surface of the tube, or any mechanism which would allow the tube to follow the tire's deformation on the road, research was concentrated on improving the inner tube itself.

The use of higher curing temperatures than the usual 307° F. was studied in the laboratory and this work established the fact that curing temperatures of 350° F. and higher were feasible and beneficial. This information resulted in the eventual adoption of higher curing temperatures by the inner tube fabricators. It also was found that the stiffness of butyl can be effectively reduced by the action of plasticizers from petroleum which lubricate the material internally to provide a softer, more resilient inner tube.

Road tests were made by many United States rubber companies and the Polymer Corporation, Ltd., of Canada, to verify five experimental inner tubes developed in the laboratory.

Field tests were set up in Minneapolis, Minn., in the area around Cut Bank, Mont., and in the western plains of Canada. The activity in Minneapolis amounted essentially to the operation of a winter experimental station, since all aspects of the driving tests were under close control. Thirty-three cars were fitted with experimental butyl tubes and x-rayed weekly during the progress of the driving tests, which extended from December, 1948, to March, 1949. During the course of this test, twenty-four sub-zero days were officially recorded.

Experimental butyl inner tubes were also mounted on fifty cars in Montana in the Spring of 1948 and allowed to run to April of 1949. During this test period in Montana, forty-two sub-zero days were recorded.

Conventional butyl tubes in use during the test showed widespread failure. However, two of the new types of inner tube showed less failures than normal, and two other types showed no failure at all.

As a means of demonstrating that butyl inner tubes could be developed which would withstand very rigorous weather conditions, a special field test was run in Western Canada, using a tube plasticized with trioctyl phosphate. These tests were run in the cities of Fort William, Winnipeg Regina, Calgary, and Edmonton.

Approximately 380 cars were fitted with experimental tubes in December, 1948, and allowed to run through March, 1949. During this time, the number of sub-zero days in the various test localities ranged from thirty-six to sixty. Minimum temperatures as low as minus 43° F. were officially recorded in a number of Canadian cities.

In April, a large proportion of the experimental tubes were selected at random and examined by x-ray technique. All were found to be free from buckles. This was considered a sufficiently valid sample to warrant the conclusion that all the tubes had successfully withstood one of the coldest winters in the history of western Canada.

No reports of abnormal failure of any of these butyl tubes due to cold weather conditions were received from any of the five Canadian cities. During this same period, it was observed generally that butyl inner tubes not specifically prepared for low temperature service were giving the same types and percentages of failures recorded in previous winters.

# *Editorials. . .*

## Labeling of Foam Mattresses

THE industry is up in arms, as it should be, on the proposal of the Federal Trade Commission to require manufacturers and distributors of latex foam sponge rubber mattresses to indicate when and how much synthetic latex is utilized in the production of such mattresses. According to a tentative ruling issued by the Commission, this information must be made on the label and in all advertising and promotional literature.

The rule was one of several tentatives issued by F.T.C. for the purpose of banning "deceptive" representations of bedding products. The Commission has done, and is doing, an exceptionally good job of protecting consumers from the purchase of "quality" merchandise of inferior make or materials. But in the current instance little value would be gained by the consumer and considerable harm done to the manufacturer or distributor, to say nothing of the producer of synthetic latex who, at the moment, is the government itself.

It should be emphasized that the industry is not fighting the labeling clause proposed because it regards synthetic latex as being inferior to the natural product. In fact, from a technical standpoint, there are many who would argue that in some properties the synthetic product is superior to natural latex, particularly in resilience on aging. There are others who stand behind the claim that a blend of natural and synthetic latex produces a mattress far superior to any made solely from one or the other material. True, there are also those who maintain an all-natural latex mattress has no competition.

Be that as it may, the major objection lies in the fact that unfortunately and completely in error the public regards synthetic rubber (or synthetic latex) as a "substitute" material and therefore an inferior material. Manufacturers of special-purpose synthetics have overcome such thinking by stressing special properties for specific applications, and in general have done a good job along these lines. But general-purpose rubber is still viewed with opprobium. Such thinking traces back to the war days when even the "War" tire, completely made of reclaim, was labeled a "synthetic" tire in the mind of the public.

Where latex foam mattresses are concerned, manufacturing skill as much as raw material is reflected in the end product. Accordingly, little would be gained if the labeling proposal advanced by the Federal Trade Commission were to be officially adopted. The ruling would probably interfere with the tremendous strides being made in the bedding field by these mattresses and would instill a doubt in the minds of those who have already purchased and are using such mattresses. The terms "latex foam," "foam sponge," "rubber latex," are all sufficiently descriptive for F.T.C. purposes. Adoption of any of these terms is urged.

## "Big Four" Combinations

IT is generally known that the "Big Four" in the rubber manufacturing industry handle by far most of the business done within the industry in each calendar year. What is not generally known is that the rubber industry is one of eleven major American industries with a "big four" combination at the top. This fact was recently unearthed by a special survey recently concluded by the Federal Trade Commission. The other ten industries include non-ferrous metal smelting, linoleum and felt base, motor vehicles, industrial chemicals, glass, paper and allied products, soaps, cleaning and polishing preparations, electrical machinery, equipment and supplies, and biscuits and crackers. According to the survey, the rate of profit of the "big four" combinations is higher than that of the smaller firms in the respective industries, and in all cases the "big four" trend was established in 1940. It is barely possible that the survey was made in connection with the quantity discount rule F.T.C. is attempting to initiate in the tire industry, although no such clue was supplied in the survey report.

# CURRENT NEWS OF THE MONTH

## 1950 MECHANICAL GOODS SALES EXPECTED TO EQUAL 1949 MARK

Sales of belting, hose and other industrial rubber products during 1950 should equal or improve over the $450,000,000 volume established during 1949, Walter F. Spoerl, general sales manager of the Mechanical Goods Division, United States Rubber pany, predicted recently.

Mr. Spoerl added one note of warning, however. "Sales of industrial rubber products," he said, "follow closely the Federal Reserve Board Index of Production. The prolonged coal strike or other major industrial tie-up which would affect this index is bound to affect the activity in the mechanical rubber goods industry."

The $450,000,000 sales volume achieved by the industry in 1949 was more than double any prewar year. However, it was $110,000,000 below the all-time record sales volume of $560,000,000 set in 1948. Mr. Spoerl attributed this sharp drop in dollar volume to: (1) The leveling off of business; (2) The hesitancy on the part of large volume industries toward forward buying; (3) Completion of inventory liquidation; (4) Strikes in basic industries; and (5) Currency devaluation abroad which brought about a sharp drop in foreign bookings.

The immediate sales outlook for industrial rubber products is favorable, he said, and is expected to remain so for at least the first six months of 1950. Demand for the major items of manufacture, namely hose, belting and packing, has shown a healthy upswing during recent weeks. This is particularly true among original equipment manufacturers who account for an important share of large volume demands for mechanical rubber goods.

The huge order backlogs which characterized the mechanical goods industry in the immediate postwar period have dropped by more than 50 per cent. This has placed major manufacturers in a more favorable position to meet delivery dates.

The general price structure in the industry is firm, Mr. Spoerl said. Prices in the rubber industry have risen far less than the rate of increase averaged by most basic industries with the result that the higher material and labor costs of the rubber industry has put a squeeze on profit margins. What trend prices show during 1950 will depend largely on the results of labor negotiations and the price trend in raw materials.

Major areas of expansion in the industry, he said, will be in the development of rubber-to-metal parts to eliminate shock, vibration and wear, and in the field of new plastics. Rubber scientists have perfected the rubber-to-metal bond to a point where the metal will deform or the rubber tear before the bond will fail to hold. This development has opened a new field for rubber parts specifically engineered for the automotive, farm equipment, oil and other basic heavy industries.

For example, rubber springs have been developed which will take the jerks and bumps out of riding a tractor. These springs, which are part of the tractor seat, consist of a thick layer of rubber sandwiched between two metal plates. They operate on the torsional shear principle.

The new plastics developed by the industry will supplement rather than compete with rubber. In many cases, however, they can do a better job than wood, brass, glass and ceramics. These plastics, which are in reality blends of rubber and synthetic resins, are finding a broadening use among manufacturers of textile equipment, meat packers for use as cutting blocks and the chemical industry in the form of chemically-resistant pipe.

Use of nylon in combination with cotton yarn for the manufacture of conveyor belting has been an outstanding development in the industry, he said. Use of nylon in combination with cotton makes possible a greater number of fabric plies which increases overall belt strength by as much as 250 per cent. At the same time, nylon gives a thick belt far greater flexibility. This means important savings in operating and maintenance costs, he declared.

### Marshall Plan Data

A recent report of the Economic Cooperation Administration indicates that fourteen countries have received $10,631,000 to date in Marshall Plan funds for the purchase of rubber and rubber products. Germany received the largest amount, $2,403,000, and Trieste the smallest, $5,000. The period covered in the report was from April, 1948, when ECA aid was first launched, through December, 1949. Other nations receiving funds earmarked for rubber purchases included the following: Austria, $811,000; Belgium, $1,000,000; Denmark, $21,000; France, $2,100,000; Greece, $1,735,000; Iceland, $10,000; Italy, $1,100,000; Netherlands, $261,000; Norway, $30,000; Sweden, $322,000; Turkey, $22,000; England, $811,000.

## SYNTHETIC LATEX LABELING PLANS OPPOSED BY INDUSTRY SPOKESMEN

Government and industry spokesmen, meeting in Washington, D. C., on March 27, assailed a Federal Trade Commission proposal requiring manufacturers of foam rubber mattresses to tell the consumer when they are using synthetic latex. The objections were raised as the FTC opened public hearings on a code of fair trade advertising and labeling practices for the bedding industry.

The Commerce Department, speaking also for the National Security Resources Board, the Munitions Board and the Office of Rubber Reserve, warned that the proposal "would discourage, if not actually eliminate, the use of synthetic rubber latex" in the potentially large market of foam rubber bedding products.

Howard D. Herbert of Hewitt-Robins, Inc., Buffalo, N. Y., speaking for the Rubber Manufacturers Association, recommended that both natural and synthetic latex be described simply as "latex foam" in advertising and labeling foam rubber mattresses. The proposed rule would raise an "unfortunate and uneconomic barrier to consumer acceptance of synthetic latex," the manufaturers declared.

Earl W. Glen, rubber director of the Commerce Department, recommended the designation "rubber latex" in advertising and labeling. Mr. Glen pointed out that rubber products containing blends of synthetic and natural rubber generally are superior to those containing one or the other. He said that manufacturing skill, more than raw material quality, makes for a good end product.

FTC's proposal to specify both natural and synthetic latex is intended to prevent deception of consumers. Once a rule is finally promulgated by the commission, any violation is subject to enforcement action in the courts.

### Plan ASTM 53d Annual Meeting

A large number of technical papers and reports, including several symposiums, will be presented at the Fifty-Third Annual Meeting of the American Society for Testing Materials in Atlantic City, N. J., throughout the week beginning June 26, 1950. The 1950 Marburg Lecture is to be given by Dr. Wallace R. Brode, associate director of the National Bureau of Standards, who will speak on spectroscopy as allied to testing and analysis of materials. The meeting will also feature an industrial exhibit of testing apparatus and related material, including laboratory supplies and all kinds of instruments used in research and testing.

## INCREASING DEMAND FORESEEN FOR FOAMED RUBBER PRODUCTS

The tremendous demand for foamed latex products, which developed in 1949, promises during 1950 to make these products among the most important ones in the rubber industry, according to Lee R. Jackson, president of The Firestore Tire and Rubber Company.

During 1949 Firestone foamed latex manufacturing facilities at Fall River, Massachusetts, where a new $2,000,000 plant was placed in operation in April, were doubled. Before the end of the year, an additional program to further increase production by 25 per cent was undertaken.

While economists credit a part of the rising demand to a sharp break in price which brought foamed latex mattresses into competition with conventional inner spring units, the growing desire for improved riding, sleeping and sitting comfort has greatly stimulated demand for all foamed latex products.

Production of foamed latex articles, such as mattresses, pillows, automobile seat toppers and public seating units under Firestone's brand name, Foamex, taxed existing facilities in the early months of 1949. However, improved manufacturing methods, including continuous foaming and electronic curing, and the opening of the new plant enabled Firestone to supply more and more customers.

### *Meeting Growing Demand*

Established bedding manufacturers, whose customers in other years had been satisfied with the conventional inner spring units, now are meeting the demand for greater sleeping comfort with full depth foamed latex mattresses and with mattress units which incorporate features of the inner spring construction with a top pad of soft, resilient, foamed latex. Many of these manufacturers turned to Firestone, whose Foamex line of foamed latex products had established an enviable record with the consumer, for foamed latex to meet individual specifications.

Most nationally known bedding manufacturers now have foamed latex lines available for their customers. In addition to the 50 mattress manufacturers, who are using Firestone Foamex form-fitting mattresses, such mattress groups as Serta Associates, Inc., with Serta Foam; Sealy, Inc., with Foamspun, and Restonic Corporation with Wonderfoam, also are using Firestone Foamex.

As demand increased for foamed latex mattresses and automobile cushioning, new applications for the material tripled. Foamed latex, once available only in premium furniture and bedding, now is included in medium priced lines by practically all manufacturers.

The automobile and transporation industries were first to turn to foamed latex for seating and cushioning. Furniture manufacturers followed. Now the housewife is demanding foamed latex for use in rebuilding older furniture and also is finding dozens of minor uses for the material around the house.

### Pliolite S-6B Reinforcing Resin

A new rubber reinforcing resin which is said to substantially improve production processing of shoe sole stocks has been developed by the Chemical Division of the Goodyear Tire & Rubber Co. Chemically similar to Pliolite S-6, this new resin will be marketed as Pliolite S-6B. Pliolite S-6B is supplied as a white granular powder, with all the physical characteristics of its "pattern," Pliolite S-6. S-6B may be incorporated in rubber by any of the established techniques for mixing reinforcing resins with rubber, and may also be incorporated by the direct Banbury mixing method. In addition to shoe sole stocks, the product may be utilized in rubber flooring, wire insulation, cover stock for golf and inflated balls, garter buttons, gaskets, hose, wringer rolls, coated fabrics, high impact stocks, hard rubber items, and miscellaneous molded goods.

### Army Awards Tire Contracts

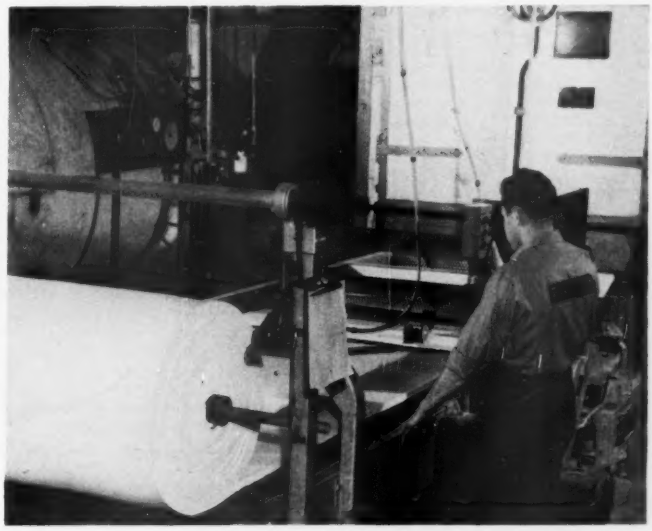
The Department of the Army has contracted for nearly $3,000,000 worth of tires and tubes, the business being spread over six firms in the industry. Mohawk Rubber Co. landed the largest of the contracts, $1,329,460. The other firms and their contracts: Pennsylvania Rubber Co., $143,-551; McCreary Tire & Rubber Co., $102,-417; Mansfield Tire & Rubber Co., $141,-225; Armstrong Rubber Co., $596,020, and Cooper Tire & Rubber Co., $595,160. The contracting was done through the Army's Detroit Ordnance District. In no case was the number of items bought disclosed.

### Rempel Plans Canadian Plant

Rempel Manufacturing, Inc., Akron, Ohio, plans to begin operation in a new Canadian plant by May. The Canadian firm, which will be a wholly-owned subsidiary, will be known as Rempel Canada, Ltd., and will be located near Toronto. It was also revealed that the company was negotiating for a plant near Mexico City to be operated by the Rempel Northrop Corp. This company will be partially owned by the Akron concern and will manufacture under a license agreement. At a recent stockholders meeting, J. B. Chisnell, sales manager of the company, was elected a director of the company succeeding J. W. Shira, president of the Oak Rubber Co. of Ravenna, Ohio, who retired from the board. All other directors and officers of the company were re-elected.

### 6th National Chemical Exposition

"A half-century of chemical progress" will be the theme of the Sixth National Chemical Exposition sponsored by the Chicago Section of the American Chemical Society to be held in the Chicago Coliseum, Chicago, Ill., September 5 through 9. This is said to be the first time that any exposition of the chemical industry has tried to focus attention on the great contributions which chemical science and industry have made to mankind during a span of 50 years. The exposition will run concurrently with the 118th national meeting of the American Chemical Society. Many special features and special exhibits are planned.



*Improved manufacturing methods, made necessary by growing demand for foamed latex products, have helped the Firestone Tire and Rubber Company to quadruple its production of Foamex at its Fall River, Massachusetts, plant. Foamex slab, which has many uses, now is produced in a continuous operation, as pictured above. An operator is using an electronic knife to cut the slab on the roll to required lengths. This production line uses electronic curing and quality control methods. This unit can produce Foamex varying in thickness from one to four inches.*

## NAWMD SCRAP MATERIAL INSTITUTE MEETS IN NEW YORK ON MARCH 13

Henry M. Rose, of H. Muehlstein & Co., was re-elected president of the Scrap Rubber Institute at the opening commodity meeting of the National Association of Waste Material Dealers, Inc., held on March 13 at the Waldorf-Astoria Hotel in New York City. Roger Ottignon, of Nat E. Berzen, Inc., was re-elected vice-president, and Ben Kaufman, of the NAWMD staff, was named secretary-treasurer.

The meeting was addressed by C. B. Shaffer, president of the Xylos Rubber Co., and C. V. Maudlin, Washington representative of NAWMD. Mr. Shaffer spoke on "The Scrap Rubber Outlook," while Mr. Maudlin addressed the group on "The Government Rubber Program." The Institute also named a four-man committee to press for reduced freight rates. The committee included Nicholas Larsen (Muehlstein), W. E. Kneesey (Muehlstein), Charles Geiger (A. Schulman), and Roger Ottignon (Nat E. Berzen).

In his address, Mr. Shaffer said that the scrap rubber outlook is good as business prospects in the rubber industry appear bright for the immediate future. If reclaimed rubber of the required quality and price can be produced, the industry will prosper, he said. All unnecessary frills in business must go. He also observed that substantial efforts are being made to reduce high freight rates which operate to the detriment of the industry.

Mr. Maudlin observed that to date no proposal has been advanced for assisting the reclaimed rubber industry, which would not, in the opinion of the administration, adversely affect the maintenance of the synthetic rubber industry at the production and consumption rates considered necessary by the government. Present indications are that it will be necessary for the rubber manufacturing industry and its branches, including the scrap rubber trade, to operate under synthetic rubber specification controls for at least the next three years.

### Another DuPont Anti-Trust Suit

Another in a series of suits filed by the Government against E. I. du Pont de Nemours & Co., Inc., under the provisions of the Sherman Anti-Trust Act, began on April 3 in New Lork. The suit was directed against DuPont, the Remington Arms Co. and Imperial Chemical Industries, Ltd. of Great Britain. The Government contends that DuPont and the British concern entered into a "combination and conspiracy" to restrain trade in chemical products, sporting arms and ammunition. The Government recently began formal suit against DuPont charging monopoly in the production of cellophane. This case was continued to May 15 when DuPont attorneys are to file exhibits and written objections to the Government documents. On June 30, 1949, the Government filed suit against DuPont in Federal Court in Chicago, Ill., seeking to divest the company of its interest in U. S. Rubber and General Motors. Final decision in this case awaits the filing of detailed briefs and rebuttals.

## Coming Events

**Apr. 19-21.** Rubber Division, A.C.S., Spring Meeting, Book-Cadillac Hotel, Detroit.

**Apr. 20.** Quebec Rubber & Plastics Group, Canadian Legion Hall, Montreal.

**Apr. 28.** N. Y. Rubber Group, Henry Hudson Hotel, New York.

**May 12.** Chicago Rubber Group, Morrison Hotel, Chicago.

**May 19.** Buffalo and Ontario Rubber Groups, Joint International Meeting, General Brock Hotel, Niagara Falls, Ontario.

**June 3.** Southern Ohio Rubber Group, Annual Outing.

**June 15.** New York Rubber Group, Annual Outing, Doerr's Grove, Milburn, N. J.

**June 16.** Akron Rubber Group, Annual Outing.

**June 16.** Boston Rubber Group, Annual Outing, United Shoe Country Club, Beverly, Mass.

**June 16.** Quebec Rubber & Plastics Group, Annual Golf Tournament.

**June 19-22.** A.S.M.E., Semi-Annual Meeting, St. Louis, Mo.

**June 23.** Detroit Rubber & Plastics Group, Annual Outing, Forest Lake, Mich.

**June 26-30.** A.S.T.M., Annual Meeting, Chalfonte-Haddon Hall, Atlantic City.

**July 14.** Buffalo Rubber Group, Annual Outing.

**Sept. 14.** Southern Ohio Rubber Group, Engineers Club, Dayton.

**Sept. 19-21.** A.S.M.E., Fall Meeting, Worcester, Mass.

**Oct. 6.** Detroit Rubber & Plastics Group, Detroit-Leland Hotel, Detroit.

**Oct. 9-10.** A.S.T.M. Committee D-11 on Rubber Products, International Meeting, Cleveland.

**Oct. 11-13.** Rubber Division, A.C.S., International Rubber Meeting, Hotel Cleveland, Cleveland.

**Oct. 20.** N. Y. Rubber Group, Henry Hudson Hotel, New York.

**Oct. 20.** Boston Rubber Group, Somerset Hotel, Boston.

**Nov. 26-Dec. 1.** A.S.M.E., Annual Meeting, New York, N. Y.

**Dec. 8.** Detroit Rubber & Plastics Group, Xmas Party, Detroit-Leland Hotel, Detroit.

**Dec. 15.** N. Y. Rubber Group, Xmas Party, Henry Hudson Hotel, New York.

**Dec. 15.** Boston Rubber Group, Xmas Party, Somerset Hotel, Boston.

### Brown Proposes Stock Increase

Stockholders of the Brown Rubber Co., Lafayette, Ind., at the recent annual meeting approved a proposal to increase the authorized common stoeks from 300,000 to 450,000 shares. The additional shares will be paid as a stock dividend on May 15 at the rate of one share for each two shares held.

## AIEE SUBCOMMITTEE ON RUBBER TO HOLD CONFERENCE IN MAY

The Subcommittee on Rubber and Plastics Industries of the Committee on General Industry Applications of the American Institute of Electrical Engineers will hold a one-day Conference on Electrical Engineering Problems in the Rubber and Plastics Industries on May 5 at the Portage Hotel in Akron as part of the Third Annual Conference of the parent society. Papers to be presented at the Conference include:

Calender Auxiliary Drives Including Constant Tension Winder Drives for Film and Fabric, by I. E. Andreasen of the General Electric Co.

Industrial Lighting of Factory and Office for Rubber and Plastic Plants, by E. A. Linsday of the General Electric Co.

Choice of Motor Speeds for Rubber Mill Room Service, by J. H. Skeen of the U. S. Rubber Co.

Recent Developments in Process Sequence Control, by E. B. Sutherland and T. C. Jones.

The Roll of Electronics in the Rubber and Plastics Industries, by E. H. Vedder of the Westinghouse Electric Corp.

Industrial Communication and Paging, by William S. Watkins of the Ohio Rubber Co.

Electrostatic Casualties in the Rubber and Plastics Industries, by Robin Beach of Engineers Associated.

The New Safety Code for Mills and Calenders in the Rubber Industry, by E. W. Beck of the U. S. Rubber Co.

### Acquires Interest in Marquardt

Laurence S. Rockefeller and a group of investors have acquired from the General Tire & Rubber Co. controlling stock interest in the Marquardt Aircraft Co., Van Nuys, Calif., manufacturers of ram jet engines and other military aircraft products. Roy E. Madquardt will remain as president and serve as chairman of the board. Mr. Rockefeller will be represented on the board by Harper Woodward, his legal counsel and aviation advisor. The purchase of 85% of the Marquardt stock and additional financing will exceed $400,000, Mr. Marquardt said. Previously announced plans for the purchase of Marquardt stock proposed the purchase of 85% of the common plus the entire issue of 910 shares of preferred for $179,000. An additional outlay of $250,000, in the form of notes or debentures supplemented by commercial bank borrowings, was to have been added as additional working capital.

### Two Nations Join Study Group

The Kingdom of Thailand and the Republic of the United States of Indonesia have officially joined the International Rubber Study Group. The other members of the Group are Australia, Belgium, British Colonies, Burma, Canada, Ceylon, Czechoslovakia, Denmark, France, Hungary, Italy, Liberia, Netherlands, the United Kingdom, and the United States of America. The seventh meeting of the Group opens in Brussels, Belgium, on May 2.

## RFC OFFICIAL PREDICTS LOSSES IN SYNTHETIC RUBBER PROGRAM

In recent testimony before a Congressional appropriations committee, J. W. Considine, controller of the Reconstruction Finance Corporation, predicted that although the Government ended the fiscal year of 1949 with an operating profit of $6,395,074, it would incur an operating deficit of $2,064,000 on the synthetic rubber program for the current fiscal year. He added that the operating deficit for the program for the fiscal year of 1951 would amount to over $6,000,000.

The losses on synthetic, Mr. Considine said, can be attributed to an increasingly heavier use of natural rubber by the rubber industry. He added, however, that the RFC believes there is a "substantial field" for synthetic in the future, with most hope being held for the low temperature polymers.

Questioned about progress in bringing down costs of the program, he said no definite statement could be made since so much of the appropriated funds, $3,900,000 this year, goes by law into the maintenance of standby plants. Mr. Considine noted that if everything but the profit motive could be disregarded, costs could be substantially reduced. Instead of manufacturing rubber in several different parts of the United States, manufacturing could be combined in one factory or in a number of factories. This would reduce overhead and costs, he said.

Production of synthetics of all types also is falling. Last year's 382,638 long tons of general purpose synthetic rubber is giving way to 305,000 long tons this year. By 1951, the plants will be turning out 284,500 long tons, according to these estimates. Special purpose synthetic rubber production is being figured for this year at 56,200 long tons. It was 69,947 long tons last year, and is estimated at 51,000 long tons in the next.

The RFC has asked for enough to continue the program, Mr. Considine told the subcommittee, because it does not feel the synthetic plants can be sold to industry by June 30, 1950, the date on which the law giving the RFC its authority in the synthetic field expires. The accompanying table offers a breakdown on income and expenses of the synthetic rubber program for the 1949 fiscal year and estimates on operations in 1950 and 1951.

INCOME AND EXPENSES, SYNTHETIC RUBBER PROGRAM

| | 1949 actual | 1950 estimate | 1951 estimate |
|---|---|---|---|
| Income: | | | |
| Sales of synthetic rubber | $173,376,888 | $145,800,000 | $130,300,000 |
| Rental income | 863,668 | 800,000 | 800,000 |
| Revenue from tank-car operations | 195,412 | 200,000 | 200,000 |
| Other income | 346,749 | 300,000 | 300,000 |
| Total income from operations | 174,782,717 | 147,100,000 | 131,600,000 |
| Expenses: | | | |
| Cost of synthetic rubber sold | 129,811,255 | 113,600,000 | 103,500,000 |
| Allocated portion of administrative expenses: | | | |
| Exclusive of pay increases | 1,591,003 | 1,637,000 | 1,625,000 |
| Pay increases | ..... | 27,000 | 41,000 |
| Research and development | 3,628,577 | 3,000,000 | 3,000,000 |
| Excess of sales freight expense over freight charged to customers | 2,706,265 | 3,000,000 | 2,600,000 |
| Contract termination expense | 36,299 | ..... | ..... |
| Loss on sale of chemicals | 143,997 | ..... | ..... |
| Other expenses | 1,564,219 | 1,200,000 | 1,100,000 |
| Total expenses before depreciation | 139,481,615 | 122,464,000 | 111,866,000 |
| Provision for depreciation | 28,906,028 | 26,700,000 | 26,100,000 |
| Total expenses | 168,387,643 | 149,164,000 | 137,966,000 |
| Net income (or loss (—)) from operations | 6,395,074 | —2,064,000 | —6,366,000 |
| Nonoperating income or expense: | | | |
| Income or loss (—) from sale or retirement of property, plant, and equipment: | | | |
| Proceeds from sales | 13,777,550 | 500,000 | ..... |
| Cost of assets sold | 48,837,053 | 15,632,065 | 3,000,000 |
| | —35,059,503 | —15,132,065 | —3,000,000 |
| Expenses for maintenance of stand-by plants | —3,218,784 | —3,900,000 | —3,500,000 |
| Research and development for national security purposes | ..... | —4,400,000 | —1,000,000 |
| Nonoperating income (or loss (—)) | —38,278,287 | —23,432,065 | —7,500,000 |
| Net income (or loss (—)) from synthetic rubber program | —31,883,213 | —25,496,065 | —13,866,000 |

### Materials Handling Exposition

The fourth National Materials Handling Exposition, which has grown to rank among the five largest industrial shows in the United States, will be held in the International Amphitheater, Chicago, Ill., from April 30 to May 4. The Materials Handling Institute will sponsor the exposition and handle the conference to be held concurrently with the show. Outstanding among the innovations at the show will be the addition of a large outdoor area to permit demonstrations of actual use of yard handling equipment. The combined indoor and outdoor exposition will cover ten acres of machinery exhibits.

### House Reports Out Rubber Bill

The House Armed Services Committee, headed by Carl Vinson (Dem., Ga.), on March 14 reported out a bill extending present rubber legislation unchanged for three years. With no dissenting vote the full committee adopted a subcommittee report that rejected all recommendations by President Truman and by the rubber and petroleum industries for transferring control of the synthetic rubber plant facilities to private industry. The full report of the subcommittee, which was also headed by Mr. Vinson, was published in our last issue. The approved bill, HR 7579, directs the Administration to eliminate controls on the use of synthetic rubber as rapidly as possible and also contains a strongly worded statement counseling against disposal of any synthetic rubber facilities. The House is expected to debate the bill some time this month. Senatorial action is being delayed until the House takes floor action.

### Stein, Hall Shifts Offices

Stein, Hall & Co., Inc., 285 Madison Avenue, New York 17, N. Y., has moved its Providence, R. I., office to the Industrial Trust Building, 111 Westminster Street. The phone number of the Providence office remains Jackson 1-6360. The Textile Laboratory has also been moved and will be established at the company's factory at 753 School Street, Pawtucket, R. I., where more and better facilities for serving the textile industry are available.

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### Goodrich Cold Rubber Process

A continuous process method for the production of cold rubber has been adopted by the B. F. Goodrich Chemical Co. at the Port Neches, Texas, government-owned plant operated by the company. The Port Neches plant is currently producing cold rubber at the rate of 30,000 tons annually. Goodrich officials explained that in the continuous processing system, butadiene, styrene, water, soap, modifier and catalyst are pumped continuously into the first reactor tank, then into the second and so on down to the twelfth tank, by which time the butadiene and styrene have been polymerized satisfactorily to form cold rubber as a latex. Under the batch-processing technique, formerly used by Goodrich, the principal ingredients were pumped into each of the 12 reactor tanks in the production series. After mixing and polymerization each batch would be discharged from the reactor into blow-down tanks for further processing. Each batch had to be laboratory checked and temperatures had to be watched constantly. The continuous filling and emptying on an individual basis not only tied up manpower but was time consuming, Goodrich officials said.

### Belfer Buys Dreyfus Plant

The A. B. Belfer Company has purchased the factory and waterfront property on Edgewater Street in Rosebank, Staten Island, N. Y., from the L. A. Dreyfus Co., a subsidiary of the William Wrigley, Jr., Co. The Dreyfus concern recently moved to a new and larger plant in Metuchen, N. J. The Belfer company, long established in the textile and bedding fields, is planning the production of latex foam sponge rubber products.

## INTERNATIONAL CHEMICAL MEET IS PLANNED FOR SEPTEMBER, 1951

Outstanding chemists and chemical engineers from more than thirty countries will assemble in New York in September, 1951, to participate in the largest international chemical conclave in history, it is announced by Dr. Ernest H. Volwiler, president of the American Chemical Society, which will celebrate its diamond jubilee at that time.

Both the Sixteenth Conference of the International Union of Pure and Applied Chemistry and the Twelfth International Congress of Pure and Applied Chemistry will convene following the seventy-fifth anniversary meeting of the American Chemical Society, scheduled for the week of September 2, according to Dr. Volwiler, who is executive vice-president of Abbott Laboratories, North Chicago, Ill.

This combination of international meetings will be the first of its kind in the United States since 1912, although the International Union met in Washington in 1926 when the American Chemical Society marked its golden jubilee. Part of the Union's 1951 meeting will be conducted in Washington.

### *Named Honorary President*

Dr. James Bryant Conant, president of Harvard University and a former professor of chemistry there, has been named honorary president of the Twelfth International Congress, at which world progress in every field of chemical science and technology will be reported. The Congress is held every four years to enable leaders in the various branches of chemistry and chemical engineering to exchange information.

The International Union, which meets every two years to set uniform chemical standards for scientists and engineers throughout the world, will decide questions of nomenclature, atomic weights, and the like. Dr. Hugo R. Kruyt of The Hague, The Netherlands, is president of the Union.

Professor Arthur B. Lamb of Harvard, recently retired editor of the *Journal of the American Chemical Society*, has been appointed chairman of the committee on organization for both the Congress and the International Union meeting. The two international sessions will be sponsored by the Division of Chemistry and Chemical Technology, National Research Council, of which Professor W. Albert Noyes, Jr., of the University of Rochester is chairman.

Dr. Harry L. Fisher, retired director of organic chemical research for U. S. Industrial Chemicals, Inc., has been placed in active charge of planning for the meetings as an administrative assistant in the Division of Chemistry and Chemical Technology, with offices in the National Academy of Sciences Building in Washington.

### *Other Committee Members*

Other members of the Committee on Organization are Gaston DuBois of St. Louis, retired vice-president of the Monsanto Chemical Company; Dr. Gustav Egloff of Chicago, director of research of the Universal Oil Products Company; Dr. Walter J. Murphy of Washington, American Chemical Society editor; Dr. Foster D. Snell of New York, president of Foster D. Snell, Inc., and Dr. Edward R. Weidlein of Pittsburgh, director of the Mellon Institute of Industrial Research.

### *$250,000 Drive Launched*

A $250,000 drive has been launched by a special finance committee headed by Dr. Weidlein to help meet the costs of the American Chemical Society jubilee program and the international meetings, which are expected to exceed considerably the money obtained from registration fees. Many of the foreign scientists and engineers who will present papers will require financial assistance while in the United States, in view of the dollar shortage in many foreign countries. The fund appeal is directed at governmental agencies and scientific and educational groups, as well as at the chemical process industries, which can be expected to benefit substantially from the meetings.

Aside from direct subsidies to foreign representatives, efforts will be made to have many of them invited to give lectures or courses at American colleges and universities before or after the meetings. Industrial organizations also will have an opportunity to employ distinguished foreigners as temporary consultants.

Assisting Dr. Weidlein in the $250,000 appeal are Dr. Gustavus J. Esselen of Boston, president of the Esselen Research Corporation; Dr. Harry B. McClure of New York, vice-president of the Carbide and Carbon Chemicals Corporation; Walter A. Schmidt of Los Angeles, president of the Western Precipitation Corporation, and Dr. Charles Allen Thomas of St. Louis, executive vice-president of the Monsanto Chemical Company and chairman of the Board of Directors of the American Chemical Society.

### *Colorful Ceremonies Planned*

Many of the visiting chemists and chemical engineers will attend the diamond jubilee meeting of the American Chemical Society, which will be the Society's 120th national meeting. Colorful ceremonies at which the foreign representatives will present greetings from their own national societies will form an important part of the jubilee program.

At the 1951 meeting, the Union will meet in New York on September 8 and 9, and in Washington on September 14 and 15, as well as September 16 if necessary. The Washington session will enable the delegates to take part in the fiftieth anniversary celebration of the founding of the National Bureau of Standards.

The Twelfth International Congress of Pure and Applied Chemistry, to be held in New York September 10 through 13, 1951, will be of special importance because it will be the first postwar meeting at which the full development of wartime and early postwar research can be discussed. The Eleventh Congress in London in 1947 came too soon after World War II for this purpose.

## GOODYEAR MANUFACTURING PLANTS HAD GOOD SAFETY RECORDS IN 1949

Safety had a field day in Goodyear plants in Akron, the United States and the world over during 1949, according to figures recently released by Jack Kidney, Goodyear safety director.

The Houston plant, with its 394 employees, worked a total of 817,000 man hours in 1949 to win the Slusser Memorial Trophy for the second year. Actually the plant has worked more than a million man hours without a lost-time accident. The last lost-time accident occurred there in September, 1948.

Following closely behind Houston was Goodyear-Sweden, whose employees worked a total of 895,620 man hours with one lost-time accident to win second place trophy. Third place trophy went to the Reclaim plant in Akron, a repeat for the second year in that position.

All Goodyear plants, either in the worldwide classification, Goodyear domestic or Goodyear-Akron showed a marked improvement during 1949. The Akron plants had a 54 per cent reduction in accidents in 1949 over the previous year, with a frequency of 4.92 compared with 10.7 in 1948, and a severity rate of .55 as compared with .68 in 1948. A total of 390 accidents in 1948 was reduced to 142 in 1949.

In Goodyear domestic plants, the frequency rate was reduced from 10.77 in 1948 to 6.56 in 1949, with severity declining from .537 to .430 in the same periods, respectively. Worldwide, the frequency was reduced from 15.50 to 9.04 and a severity of .612 to .519 with the reduction of 1885 accidents in 1948 to 1034 in 1949.

Plant C was second in the standings among the Akron plants with a frequency-severity rate of .104 followed by the Plant I engineering division in Akron with a frequency-severity rate of .282.

"The efforts in the Goodyear-wide campaign for safety in 1949 certainly bore results," Jack Kidney said. "It clearly indicates that some heed has been paid to our constant 'preaching' about the dividends that safe practices and conduct will pay off."

President E. J. Thomas said, in complimenting all Goodyearites on the fine mark: "The best safety department in any plant is the one made up of all of us preaching, talking, planning and training for safety and setting the example ourselves—as long as there is a single accident, there are too many. This record for the past year shows that improvements can be made."

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A two-page bulletin on the subject of explosion-proof motors from ¾ to 125 h.p. is available from the Reliance Electric & Engineering Co., Cleveland 10, Ohio. Details of motor construction to provide maximum corrosion-resistance protection are featured.

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"Thionex-MBTS Acceleration for Low Temperature GR-S Tread Compounds" is the title of a recent technical bulletin issued by the DuPont Rubber Chemicals Division. Ask for Bulletin BL-235.

## ASTM COMMITTEE D-11 ON RUBBER PLANNING INTERNATIONAL MEETING

Plans for an International Meeting on Rubber and Rubber Products to be held in Cleveland during the week of October 9 were discussed at the meeting of A.S.T.M. Committee D-11 on Rubber and Rubber-Like Materials, held in Pittsburgh, March 2 and 3, in connection with A.S.T.M. Committee Week. Arrangements are being prepared in cooperation with the American Chemical Society's Division on Rubber Chemistry.

It is also expected that a meeting of ISO Committee 45 on Rubber of the International Organization for Standardization, will be held in Cleveland in connection with the D-11 meeting on October 9 and 10. This will be followed by an International Conference on Rubber sponsored by the ACS Division at which some 16 technical papers from European technologists will be presented.

In Pittsburgh work was initiated on a new project to test procedures for checking adhesion of bonded brake shoe and lining assemblies. This work is very timely in view of the very recent use of this method of applying brake linings in the manufacture of automobiles. The committee reviewed detailed descriptions of testing procedures now in use by a number of manufacturers, including Inland Manufacturing Division of General Motors Corp., Chevrolet Gear and Axle Division, Bendix Products, General Motors Research Laboratories, Moraine Products Division of GMC, Chrysler Corp., and B. F. Goodrich Co. This new method of bonding brake linings increases greatly the life of the brake lining and also improves the effective braking area.

### *Relaxation Characteristics*

The relaxation characteristics of gaskets and packing materials received considerable attention. A survey of methods and apparatus in use has uncovered a number of devices as follows:

(1) Devices for recording relaxation continuously: (a) Beam machines of Blaw and Fletcher, Goodrich, and General Motors; (b) Baldwin Southwark hydraulic machine with strain holder; (c) Gehman air loader with automatic unloading; (d) the Farnam-Cole Relaxometer; (e) the Hypolog and modifications by New York Navy Yard and Government synthetic laboratory based on the SR-4 strain gage.

(2) Devices employing an aging jig which is tested for relaxation after an interval: (a) the Hopkins relaxation cell and modifications of the New York Navy Yard method; (b) the Mare Island Compressometer; (c) the Dresser Flush pen recorder; (d) Garlock Jig; (e) Navy Yard Seal Test.

The 1.129 by ½-in. pellets of two 40 durometer GR-S compounds which differ markedly in compression set at 194°F. have been distributed and an effort is being made to have these tested at 40 per cent deflection and at 158°F. and 212°F. Partial results to date indicate that all machines rank these relaxations in the same order as the compressometer although individual results vary widely. Full data will be reported in June.

A study is to be undertaken of a new method for compressibility and recovery of gasket materials. While the method was prepared primarily for automotive gaskets it can be used for other rubber products and will also be suitable for floor coverings such as linoleum, asphalt, rubber tile, etc.

Work is to be started on test methods for crude natural rubber by a new subcommittee under the chairmanship of Norman Bekkedahl, of the National Bureau of Standards. The committee also plans to organize a new subcommittee on statistical quality control.

### *Tension Test Revised*

An important accomplishment was the revision of the tension test of vulcanized rubber (D 412-49T) which had been prepared in cooperation with representatives of industry and a number of Government agencies. The revised methods represent a considerable improvement in the technique for the tension test procedure which is one of the most widely used methods. Further study is to be made, particularly on increasing the speed of testing from the present rate of travel of the power actuated grip of 20 ± 1 in. per min. to 40 in. per minute.

The extensive methods covering procedures for the chemical analysis of rubber products (D 297-43 T) have been revised. The revision represents largely a rearrangement of the method but also includes certain changes to improve the analytical technique. These revised methods have been prepared in cooperation with the Federal Specifications Board. Several new methods which employ optical, mechanical, and electronic devices in the testing of hard rubber are being studied in some 12 cooperating laboratories.

It was reported that the SAE-ASTM Joint Committee on Automotive Rubber had completed new specifications which cover four different types of automotive mats with tensile strengths from 400 to 900 psi. New SAE-ASTM specifications for rubber cups for high temperature and heavy-duty service have also been completed. These cover molded cups compounded from high-temperature resistant rubber for use in hydraulic actuated cylinders employing hydraulic brake fluid of a non-mineral oil type.

The specifications are based on performance tests of the hydraulic brake cups under specified conditions and do not include requirements relating to chemical composition, tensile strength and elongation of the rubber compound. In addition revisions have also been completed in the existing tentative specifications for natural rubber cups for use in hydraulic actuating cylinders (D 818-45 T: SAE R 60).

## McLEAN AND WELLHEISER ARE ADVANCED BY BRITISH RUBBER CO., LTD.

A. Stuart McLean

E. G. Wellheiser

A. L. Mailman, president of the Mailman Corporation, Ltd., has announced the appointment of A. Stuart McLean as president and E. G. Wellheiser as vice-president of the British Rubber Co., Ltd., of Montreal, Canada. British Rubber is a subsidiary of the Mailman Corp. Mr. McLean, formerly a vice-president of British Rubber, has been in charge of manufacturing at the company's plant in Lachine, Quebec, for the past 12 years. He will continue to make his headquarters at the Lachine plant and will continue to supervise manufacturing operations. Mr. Wellheiser has been associated with the rubber footwear industry in Canada since 1926, including a long tenure of service with the B. F. Goodrich Rubber Co. He joined British Rubber as general sales manager in 1948 and was named a director in 1949.

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## SOUTHERN OHIO HEARS WIARD ON PROPERTIES OF SILASTIC

The March 2 meeting of the Southern Ohio Rubber Group, held at the Engineer's Club in Dayton, Ohio, featured an address by William A. Wiard of the Technical Sales Department of the Dow-Corning Corp., Midland, Mich. Mr. Wiard spoke on "Silastic—Its Properties and Place Among Synthetic Rubbers." At a business session preceding the technical meeting, outgoing chairman James L. Fitzgerald (Premier Rubber) introduced the new officers and directors to the group members. A motion that the outgoing chairman be made a member of the board of directors for one year was carried.

Mr. Wiard briefly discussed the history and the chemical construction of silicones, the basic properties common to all silicones, and the basic properties of Dow Corning's mold release agents. Many exhibits were shown by slide projector, and a large number of other exhibits were displayed. Mr. Wiard also discussed some of the fabrication problems encountered with Silastic, Dow-Corning's silicone rubber.

An outstanding exhibit was given to indicate the imperviousness of Silastic to a wide range of temperatures. One end of a piece of hose made from the material was placed in dry ice at —180° F., while the other end of the hose rested on a hot plate at 500° F. The piece was then removed from test, stretched, and showed no indication change in its properties.

### New York Group Spring Meeting

The Spring Meeting of the New York Rubber Group will be held on April 28 at the Henry Hudson Hotel in New York City. Principal speakers at the meeting will be E. Charlton Crocker of the General Latex and Chemical Corp., Cambridge, Mass., and Erdon Stowell of the Carbide and Carbon Chemicals Division of the Union Carbide and Carbon Corp., New York, N. Y. Mr. Crocker will speak on the "Manufacture of Foam Rubber," in which he will present a review of present methods of manufacture, trends towards new equipment and the growth pattern of the industry. Mr. Stowell will address the group on "Dynel—A New Synthetic Fibre." His talk will cover the manufacture, properties and uses of Dynel; also a brief exposition of possible applications in the rubber industry. The technical meeting will be followed by a cocktail hour, dinner and entertainment.

### February Consumption Declines

Estimated consumption of new rubber during February declined to 87,987 long tons from 94,159 long tons in January, a decrease of 6.56%, according to a report of the Rubber Manufacturers Association. Natural rubber consumed in February totaled 56,527 long tons, a decrease of 6.13% from January when 60,218 long tons were consumed. Consumption of synthetic rubbers during February decreased 7.31% to 31,460 long tons from 33,941 long tons the month before. Reclaimed rubber consumption for February was estimated at 18,864 long tons, 6.55% lower than the January tonnage of 20,187 long tons.

### Hollis Named Division Manager

Edward W. Hollis

Edward W. Hollis, formerly vice-president of Laminated Plastics, Inc., has been named manager of the Rubber Division of the Parker Appliance Co., Cleveland 12, Ohio. Mr. Hollis, a native of Waco, Texas, had previously been sales manager of the Coach and Car Equipment Corp., Chicago, Ill., following 17 years of Naval service. At the same time, E. L. Carlotta, research and development engineer of the Rubber Division, was given the additional duty of rubber sales manager. Don C. Pierce, Jr., has joined the company as a rubber sales engineer. He was previously associated with the Cleveland Republic Tool Corp. and the Curtis Sales Corp.

## ELECTION OF OFFICERS FOR 1950 MARKS ONTARIO GROUP MEETING

An election of officers for the 1950-51 season featured the March 14th meeting of the Ontario Rubber Section of the Chemical Institute of Canada, held at Hart House at the University of Toronto in Toronto, Canada. The following members were elected to office for the new season: *Chairman*, F. R. Gorrie (Delacour-Gorrie); *Vice-Chairman*, H. Schmalz (Dominion Rubber); *Secretary-Treasurer*, J. A. Carr (Dunlop Tire). Newly-elected executive members of the group are: W. J. Nichol (Gutta Percha & Rubber) and W. D. Stewart (Firestone).

The meeting also featured an address by William A. Wiard of the Technical Sales Department of the Dow-Corning Corp., Midland, Mich. Mr. Wiard's address on "Silastic—Its Properties and Place Among Synthetic Rubbers," was similar to one he delivered before the Southern Ohio Rubber Group on March 2. A report on that address appears elsewhere in this issue.

### Garlock Packing Co.

For 1949: Net income of $487,996, which is equal to $1.16 a share, compared with a net of $1,369,581, or $3.27 a share, in 1948.

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## OWEN AND McCORMACK ADDRESS BOSTON RUBBER GROUP MEETING

The Spring Meeting of the Boston Rubber Group, held on March 17 at the Somerset Hotel in Boston, Mass., was attended by approximately 350 members and guests. Featured speakers of the day were Dr. W. W. Owen, technical representative for Cordura sales of E. I. du Pont de Nemours & Co., Inc., and Charles E. McCormack of DuPont's rubber laboratory. Dr. Owen spoke on "The Use of Synthetic Fibers by the Rubber Industry." Mr. McCormack spoke on "Factors Influencing the Formation of Blisters in Rubber Products During Wet Service."

In his address, Dr. Owen noted that the day of a universal fiber for the wide ramifications of the rubber industry is past. As old fibers are improved and new fibers developed, they will be used for specific applications determined by the balance between economics and the characteristics of the individual fibers. Dr. Owen also itemized the benefits to be derived through the use of the various synthetic fibers.

Mr. McCormack presented evidence to show that blisters occurring in covered rolls and in tank linings are caused by osmotic pressure resulting from a small amount of water-soluble contaminant trapped between the plies of the roll or tank lining.

### Buffalo Group Hears Bridgwater

The April 4 meeting of the Buffalo Rubber Group, held at Elk's Temple in Buffalo, N. Y., was addressed by E. R. Bridgwater, director of sales for the Rubber Chemicals Division of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., and Harry Maynard, special agent in charge of the Buffalo Division of the Federal Bureau of Investigation. Mr. Bridgwater's address on "Synthetic Rubber Looks Into the Future" was similar to one he delivered before the Chicago Rubber Group on March 24, details on which are published elsewhere in this issue. Mr. Maynard's address covered "Activities of the FBI." The International Meeting, held jointly by the Buffalo Group and the Ontario Rubber Section of the Chemical Institute of Canada, scheduled for May 19 at the General Brock Hotel, Ontario, Canada, will be addressed by Dr. Harlan A. Trumbull of the Research Center of the B. F. Goodrich Co., Brecksville, Ohio. Dr. Trumbull will speak on "The Very Ability of the Rubber Chemist."

### Buffalo-Ontario Joint Meeting

The annual International Meeting of the Buffalo Rubber Group and the Ontario Rubber Section of the Chemical Institute of Canada, scheduled for May 19 at the General Brock Hotel, Niagara Falls, Ont., Canada, will be addressed by Dr. Harlan L. Trumbull, director of colloid and textile research of the B. F. Goodrich Co., Brecksville, Ohio. Dr. Trumbull will speak on "The Very Ability of the Chemist."

## BRIDGWATER ADDRESSES CHICAGO ON FUTURE OF SYNTHETIC RUBBER

Approximately one hundred members and guests of the Chicago Rubber Group attended the March 24 meeting held at the Morrison Hotel in Chicago, Ill. The meeting was addressed by E. R. Bridgwater, director of sales for the Rubber Chemicals Division of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. His talk was entitled "Synthetic Rubber Looks Ahead."

Mr. Bridgwater reviewed the historical record of consumption of the various synthetic rubbers since 1941 and pointed out that all of them have declined sharply from their wartime peaks. GR-S supplied 59% of our total elastomer consumption in its peak year, 1944, and in 1949 only 29.2%. Butyl reached its peak consumption in 1946 when it supplied 6.7% of our total elastomer consumption. It has retained a larger portion of its wartime market than any of the other synthetics, having declined in 1949 to 4.8%. Neoprene supplied 5.5% of the elastomer consumption in its peak year, 1944, and in 1949 had declined to 2.9%. The nitrile rubbers furnished 2.0% of the total elastomer consumption in 1943, whereas in 1949 they furnished 0.6%. In endeavoring to forecast future trends the speaker considered separately synthetic rubber for tires, for inner tubes, and for other products.

### *Future in Tire Industry*

In the tire industry the future is not bright. Although low temperature polymerized GR-S is an excellent rubber for passenger car tire treads, it is not the equal of natural rubber for passenger car tire carcass stocks. More serious from the point of view of national defense is the fact that we have no synthetic rubber from which a satisfactory pneumatic truck tire can be made. The total inadequacy of GR-S for truck tires is evidenced by the purely token requirement for its use in truck tires under Rubber Order R-1.

During World War II we had a substantial continuing supply of natural rubber available from Ceylon and Liberia, but in another emergency these sources might be closed to us. There is every reason to believe that a satisfactory synthetic rubber for truck tires can be developed if the problem is attacked on all possible fronts. However, it seems unlikely that any modification of GR-S will solve the problem, bearing in mind that the GR-S field has already been exhaustively studied. It would seem desirable to encourage private competitive research on synthetic rubber for tires, but the Rubber Act of 1948 has an opposite effect. That law authorizes the President to specify not only the percentage of synthetic rubber that must be used in various types and sizes of tires but also the particular kind of synthetic rubber that must be used.

Specifically, the R-1 Order requires the use of GR-S produced by the Government. It is probable that under today's conditions tire manufacturers would use GR-S even though competition between GR-S and other synthetics was permitted. However, if a tire manufacturer should find that by using some other synthetic rubber he could make tires that would serve his customers better, there is no assurance that he would be permitted to use it. So long as the law provides for an actual or potential restraint on competition between various American synthetic rubbers for tires it serves to discourage research and development in that field.

With respect to inner tubes, the picture is much brighter. Some difficulties were encountered with butyl rubber in the past, but improved grades have been developed and it is today generally agreed that butyl is an excellent tube rubber. During recent months the R-1 restrictions have been removed and butyl is consequently being given the test of free competition, which is the ultimate test of value.

### *Non-Transportation Products*

In non-transportation products the future of synthetic rubber looks extremely bright. All of the synthetics have been in free competition with one another and with natural rubber since September, 1947. The consumers of non-transportation elastomeric products cast their votes with the dollars they spend, and in 1949 elected to use natural rubber to the extent of only 50.4% of the total. GR-S contributed 24.9%, reclaimed rubber hydrocarbon 14.4%, neoprene 7.9%, nitrile rubbers 1.8%, and butyl 0.5%. Indications are that in 1950 the synthetic rubbers will supply a still larger percentage of our non-transportation elastomer requirements.

There are many private American companies that are engaged in vigorous programs of research on improved synthetic rubbers for non-transportation products. With hundreds of available or potentially available polymerizable monomers from which special-purpose synthetics can be made, the possibilities for the production of tailor-made polymers to meet specific end-use requirements are literally boundless.

American rubber manufacturers, operating in a highly competitive market, have been quick to take advantage of any improved rubber that enables them to make more serviceable products and give their customers better value for their money. In such an environment technical progress is bound to be made. Looking into the future, it is as nearly certain as anything can be that natural rubber's percentage of the non-transportation elastomer market will continue to decline and may within ten years drop to less than 25%, Mr. Bridgwater concluded.

Prior to the social and technical hours, the group heard an address by Wayne Griffin, supervisor of the personnel office of the Electromotive Division of the General Motors Corp., on "This is Our Problem." The address was presented under the auspices of the Employers Association of Chicago on the thesis of "Our American Way of Life." Mr. Griffin outlined the freedom forum objectives for preserving our way of life.

### Gro-Cord Rubber Co.

For 1949: Net income of $84,801, which is equal to 77 cents a common share, compared with $143,682, or $1.31 a share, in 1948.

## WESTERN INSULATED WIRE COMPANY CONSTRUCTING NEW PLANT

*Depicted above is an artist's conception of the first 40,000 square-foot unit of a new plant being constructed by the Western Insulated Wire Co. in Los Angeles, Calif. The plant is scheduled to begin operations on June 1, 1950.*

Western Insulated Wire Co., 1001 East 62nd St., Los Angeles 1, Calif., is constructing the first 40,000 square foot unit of their new plant on a two and one-half acre tract in Los Angeles. The $500,000 plant is scheduled to go into operation by June 1, 1950. The Western Insulated Wire Co. was founded in Los Angeles 13 years ago and shortly thereafter began the manufacture of neoprene-jacketed wires and cables as a standard commercial product. The company is said to be the third largest user of neoprene on the West Coast, and manufactures more neoprene-jacketed cable per square foot of plant space than any other cable manufacturer.

The firm has just introduced a line of portable electrical cords and cables with jackets certified to contain not less than 60% by weight of new neoprene. The line, called "Bronco 60 Neoprene Certified," has the size, type, rated voltage carrying capacity, number of conductors, and Pennsylvania and U. S. Bureau of Mines approval number vulcanized into the jacket. The Bronco 60 certified line consists of 1 to 8 conductor cords and cables in a wide range of sizes.

## 1950 AMERICAN TOY FAIR HITS ALL-TIME RECORDS

Highs in both number of exhibitors and registration were achieved at the 47th Annual American Toy Fair held in New York City from March 6 through 17 under the sponsorship of the Toy Manufacturers of the U. S. A., Inc. More than 1200 toy firms exhibited their wares and registration topped 11,000. Based on sales recorded during the 11-day period, it was generally agreed that toy sales this year will again top the $300,000,000 mark.

The varied lines of numerous rubber manufacturers were displayed as usual at this annual exhibition and many new and revised lines were introduced. For example, among the staple rubber items, Sun Rubber Co. displayed its varied line of dolls, footballs, basketballs, and novelties. The company showed for the first time three new jointed sleeping-wetting dolls, in the popular price range, featuring realistic flesh coloring. The popular Amosandra doll was also on exhibit.

Another varied line was that of the Seamless Rubber Co. This exhibit included athletic balls featuring nylon winding, butyl bladders, and "Kolite" covers, the latter made of a new abrasion-resistant rubber compound. Seamless also displayed its "Swim-Eze" men's swim trunks and its "Slim-Ettes" for women, as well as its full line of bathing caps and accessories. Crepe shower caps were also shown as was the company's line of Jolly Balls for beach, yard and home use.

Auburn Rubber Corporation was another rubber concern showing a multiple line of all-year toys and novelties in both single pieces and packaged sets. New items included a mule team and wagon set and a cowboy on a horse, both pull toys. The familiar line of Arcor molded tractors, automobiles, airplanes, trucks, etc., all finished in brilliant colors, was also on exhibit. Rounding out Auburn's display was a new line of rubber balls, with new designs and mottling, as well as solid colors.

### *Other Variety Lines*

Still another variety rubber line was that of the Seiberling Latex Products Co. which included inflated sport balls and play balls, sculptured bounce toys, dipped latex animal toys, and blown rubber baby dolls and character toys. A number of the Seiberling Latex items featured new designs and colors.

Latex character toys of new and novel design were shown by several manufacturers. These included Ozzie the Ostrich, with real feathers, shown by Molded Latex Products, Inc.; Rudolph the Red-Nosed Reindeer, by Oak Rubber Co.; Jerry Giraffe, by Eastern Rubber Specialties Co., and a clown that actually blows up balloons through a slit in his nose, introduced by the Tillotson Rubber Co. Molded Latex Products also displayed a reversible Cinderella doll, as well as its well known line of Kaysam Joy Toys, including the relatively new Howdy-Doody latex puppet. Most of the character toys this year were of the "squeeze-me" type, packaged in attractive cellophane window boxes.

### Rubber Spreader Fire

An operator was removing rubber compound from a belt in a coating machine at a Canadian plant when a static spark ignited flammable vapors. The flames quickly involved the entire coating section and heat opened two sprinklers overhead but the operator with good judgement tripped the carbon dioxide fixed-pipe system and turned on the open sprinklers in the machine. With the operation of the protective system the equipment stopped; the cement pump shut off automatically and the fire was of short duration. About eight linear feet of belting was destroyed. Here is an experience that proves the value of good fire protection and proper instruction of employes. *Factory Mutual Record.*

Play balls were exhibited by a number of rubber manufacturers. The Darex line of play balls was shown by the Dewey and Almy Chemical Co., including a heavy-duty ball for playground use and a new premium rainbow ball in a 16-inch size. A number of the Darex balls feature swirling, marbleized colors. Color was also predominant in the line shown by the Eagle Rubber Co. which included a new stripe design and a wild west design. This company also displayed two-tone high bouncers, featuring a velvet-like finish. Eagle Rubber also had on display the ever-popular Walt Disney character balls, each individually wrapped in cellophane. Sponge and gas-inflated balls were also displayed by the Barr Rubber Products Co.

Balloons of every size, shape and description were included among the exhibits, including those made by the National Latex Products Co., Eagle Rubber Co., Maple City Rubber Co., Barr Rubber Products Co., and the Miguin Rubber Corp. The trend in this field continues toward packaged sets. For example, National Latex Products is featuring a gift package containing 40 balloons in assorted styles and colors. Carded balloon assortments are also increasing in favor. Maple City Rubber featured a balloon "sculpture" set, with ten balloons to the set. Most of the balloon manufacturers displaying their wares also had toss-ups on exhibit.

### *Rubber Masks Exhibited*

Rubber masks seem to have taken the fancy of the toy trade, and several manufacturers exhibited rubber mask lines for the first time. These included the Topstone Rubber Toys Co., with faces ranging from the grotesque to the comic, all created and designed by Keith Ward; Latexture Products, Inc., with Howdy Doody and Clarabell masks, made famous by the television networks, and the United Mask and Novelty Co., of Woodhaven, N. Y. Several of the regular fabric and papier mache mask manufacturers have added rubber masks to their lines.

Another rubber exhibitor at the toy fair for the first time was the U. S. Rubber Co. which displayed its line of water novelties, including swim rings, play balls, inflated cushions, and water toys. Also exhibited were the company's well-known line of Howland and other swim caps and U. S. Royal bathing shoes. All-rubber wading pools and the new Rigid-Aire wading pool, which features rigid sidewall construction, were also shown by the company.

Vinyl toys were very much in evidence at the 1950 toy fair, as has been the case in the past few years. All-plastic wading pools, many of them featuring 20-gauge Vinylite sidewalls, were displayed by the U. S. Fiber & Plastics Corp., Bilnor Corp., Plastictronics, Inc., Philmont Manufacturing Co., Doughboy Industries, Inc., and others. Some of these companies also exhibited plastic boats, surf mats, swim rings, and other beach accessories. Plastictronics showed a bathtub boat, 36 inches in size, designed to give youngsters the sensation of sailing.

### *Inflated Vinyl Novelties*

Inflated vinyl water novelties included a sea horse, 2 feet high, shown by Plastic Innovations, Inc., a seal, 36 x 32 x 38 inches in size, by the Clarvan Corp., a whale, 44 inches long by 21 inches wide, by Doughboy Industries, Inc., and a turtle, 30 inches long, also by Doughboy Industries. An interesting water novelty displayed by Clarvan was a Mother Goose Swim Belt, an easily inflated swim belt with miniature Mother Goose characters, in third dimension, with a non-slip, adjustable plastic belt, halter and safety valve.

Two additional plastic novelties at the show were Bendy the Bunny, a vinyl character stuffed with scrap foam sponge, which remains at any angle he is bent, displayed by Cleefoam, Inc., of Long Island City, N. Y., and Putty Puss, a novelty featuring the face of a cat and filled with soft clay making it possible to distort the facial features and form new and grotesque faces, exhibited by Bryan Specialties of New York City.

## Thiokol Club Hears Calcott

Approximately 125 members and guests attended the March 15 meeting of the Thiokol Technical Club held at the plant of the Thiokol Corp., 780 North Clinton Avenue, Trenton, N. J. The technical meeting, which was preceded by a social hour and dinner, was addressed by Dr. W. S. Calcott, manager of the Organic Chemicals Department of E. I. du Pont de Nemours & Co., Inc. Dr. Calcott spoke on "Control of Reactions by the Use of Additives." The speaker discussed the use of additives and the importance of even minute quantities in control of reactions. Even quantities of a fraction of a percent completely control a reaction, he said. Of considerable interest was Dr. Calcott's discussion on the use of accelerators and antioxidants in the vulcanization of rubber.

**An index to Volume 66 of RUBBER AGE will be found on Pages 125 to 128 of this issue.**

# 3 COMPOUNDING ADVANTAGES

COLUMBIAN CARBON COMPANY

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### General Tire Plans Israel Plant

General Tire & Rubber Co., Akron, Ohio, has completed arrangements with the Government of Israel to establish a rubber manufacturing company in that country for the manufacture of tires, tubes and allied products. The new company, which will be known as the General Tire & Rubber Co. of Israel, will have an approximate capitalization of $2,000,000 with General Tire holding a minority interest resulting from a $168,000 investment. The company will be formed with 760,000 shares with a par value of one Israeli pound a share. General Tire has agreed to purchase 60,000 shares and the remaining 700,000 shares will be sold through a private offering. The new plant will be located in the vicinity of Haifa and will cost about $1,750,000 to erect and equip. Palestine Trade & Investment Co. will represent the plant in Israel and Colonel Harold Riegelman will represent it in New York. The contemplated plant will be the only tire and tube factory in the Near East and, when completed, will produce between 80,000 and 100,000 tires and tubes annually and will employ approximately 300 persons.

### Time Study Conference Set

The Fifth Annual Time Study and Methods Conference sponsored by the Society for Advancement of Management and the Management Division of the American Society of Mechanical Engineers will be held on April 20 and 21, at the Hotel Statler in New York City. The conference will feature the presentation of papers including "What is a Fair Day's Work?"; "Inequities in Incentives"; "Rating of Time Studies"; "How to Determine Work Load"; and papers of a like nature. Full discussion periods will be allowed after the presentation of each paper.

### Johnson Rubber Purchases Plant

Johnson Rubber Co., Middlefield, Ohio, has purchased the former Leader Tractor Co. plant in Auburn, Ohio, and will move its plastics manufacturing operations there from its plant in Bainbridge, Ohio. It has not yet been decided if Johnson will sell or lease the Bainbridge plant to another firm, or will continue to use it for another purpose. Transfer of operations to the Auburn plant is expected to be completed in three or four months. Additional equipment has been purchased which will enable Johnson to increase its volume substantially.

### Moves Sales Offices to Ansonia

Farrel-Birmingham Co., Inc., Ansonia, Conn., has moved the offices of the Gear Sales Division from its plant in Buffalo, N. Y., to the home office at Ansonia. The Marine Sales Division, formerly located at the New York office, has also been moved to Ansonia. The moves are in line with the company's policy to coordinate and centralize various departmental functions. R. C. Wilson, manager of Buffalo sales for the past several years, will continue in that capacity, with headquarters at Ansonia.

### Traflet Returns to Pequanoc

Fred Traflet

Fred Traflet, former president of the Pequanoc Rubber Co., Butler, N. J., has completely recovered from his recent illness and has returned to the company after an absence of more than a year. Mr. Traflet's return is on a full-time basis. He will act in the capacity of special sales and research consultant for Pequanoc. During his 26 years in the reclaim industry, Mr. Traflet has been responsible for many chemical developments which have aided in the postwar transition of the reclaim industry.

### To Report on I.T.O. Charter

The rubber manufacturing industry is nearing the conclusion of a year-long study of the proposed International Trade Organization and will be prepared shortly to report its detailed views to Congress. In a letter sent to all members of Congress on March 13, the Rubber Manufacturers Association indicated that a majority of the industry opposed the Charter. The industry's principal areas of interest in the Charter, according to the association, are the sections dealing with intergovernmental commodity agreements and economic development and foreign investment. The R.M.A. letter was mailed with copies of the printed proceedings of the rubber industry forum on the I.T.O. recently held under the auspices of the association.

### Burgess Pigment Mineral Colors

Burgess Pigment Co., 64 Hamilton Street, Paterson, N. J., has announced the addition of four new mineral colors to the line offered the rubber and other industries. The colors include Burgess Neo Brown, a new mineral oxide mixture suitable for the manufacture of heels and soles. Another is Burgess P O S J Brown, a mineral oxide mixture for use in jacketed cable cords. The others are Burgess Buta Reds No. 1 and No. 2. These are synthetic red oxides specially suited for use in natural and synthetic rubber compounds.

### Truck Tire Prices Raised 5%

Increases averaging about 5% in the list prices of its first-line truck tires were announced by the B. F. Goodrich Co., effective April 1. This move was joined by U. S. Rubber Co., who raised the price of its first-line truck tires by 5% effective April 5. Goodyear Tire & Rubber Co. announced a similar price adjustment at the same time. Goodrich, in announcing its truck tire price advance, cited the rising cost of natural rubber as well as other costs as necessitating its increase. Pension costs have also been mentioned in the trade as one of the principal factors likely to force all tire prices upward. At this writing only Goodyear, Goodrich and U. S. Rubber had announced the price rises. It was generally expected, however, that the remainder of the industry would shortly follow suit. J. P. Seiberling, president of the Seiberling Rubber Co., the firm which initiated the second general advance of 3½% last fall, has predicted, for example, that further increases of 10 to 12% in passenger car tire prices would take place before summer.

### Peninsular Rubber Expansion

Peninsular Rubber Co., Port Clinton, Ohio, has purchased a 48 x 80-foot brick building near Marblehead, in an expansion of company facilities. Offices of the company, formerly located on Peninsular Avenue, will be moved to the new site on Fremont Road. The building, built in 1947, was formerly occupied by a laundry. It was purchased with equipment intact since Peninsular Rubber believes it can utilize the equipment. Present plans call for the manufacture of products for the automotive and aircraft trade at the old plant and to transport the products to the new plant for finishing, packing and shipping operations. Clifford Christiansen is president and general manager of the company.

### Goodyear Blimps For Lease

Goodyear Aircraft Corp., Akron, Ohio, is making three blimps available on lease for advertising purposes in an attempt to find a commercial use for airships. As the world's only manufacturer of blimps, Goodyear presently has only one customer, the United States Navy. In this latest move, the company offers to cover 187 out of the 200 largest market areas in the United States from the air. The program would start about May 1 and end about November 1. The blimps would operate out of Wingfoot Lake, near Akron.

### Ringler Co. Moves Offices

Coincident with their 80th year of business operation as electrotypers and makers of graining plates for industry, the F. A. Ringler Co. is moving to new and larger quarters at 418 West 25th St., New York 1, N. Y. In combination with new sales and show rooms for the Electroform Graining Plate Division, the entire facilities of the plant will be housed at the new address. The Ringler company is utilizing graining patterns from the famous German Dornbusch collection.

# NAMES IN THE NEWS

HOWARD H. SPRINKLE, associated with the Republic Rubber Division of Lee Rubber and Tire Corp. since 1923, has been appointed assistant sales manager of the division.

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GEORGE H. DUCK, vice-president in charge of public relations of the Lee Rubber and Tire Corp., and associated with that company for the past 24 years, has retired from active service with the company.

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MAX W. CONNER, former section head in raw materials control for the foreign and domestic plants of the Goodyear Tire & Rubber Co., has been appointed purchasing agent and a division superintendent of the Bogor, Java, plant.

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R. W. DEEMER, formerly assistant sales manager of the Republic Rubber Division of the Lee Rubber and Tire Corp., has been appointed production manager for the division, succeeding H. W. CROYSDALE, who has resigned. At the same time, H. M. CONNER, previously assistant credit manager, was named division credit manager.

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LEE WHITE, formerly associated with the Gavitt Manufacturing Co. and the General Cable Corp., has joined the technical staff of Walker Bros., Inc., Conshohocken, Penna.

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BYRON H. MARTIN, associated with the Goodyear Tire & Rubber Co. in supervisory capacities for more than 10 years prior to organizing his own manufacturing and engineering company in 1946, has joined the Biggs Boiler Works Co., Akron 5, Ohio, as vice-president.

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JOHN F. BOHMFALK, formerly associated with the U. S. Rubber Co. and more recently with the Office of Rubber Reserve at Washington, D. C., has joined the editorial staff of the American Chemical Society. He will work out of the New York office.

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HAROLD J. NEWTON, for many years vice-president and general sales manager of the National Electric Products Corp., Pittsburgh, Penna., recently resigned from the company because of poor health.

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ALBERT J. DUCLOS, who received his training at the Rhode Island School of Design and who was associated in the past with the engineering departments of various wire machinery manufacturers, has joined the engineering staff of the Standard Machinery Co., Mystic, Conn.

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DONALD H. JONES, formerly associated with the Bull Dog Electric Products Co., recently joined the Irvington Varnish & Insulator Co., Irvington, N. J., as general sales manager of the Coating and Fibron Divisions.

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ERIC W. LUSTER, associated with affiliates of the Standard Oil Co. of New Jersey for the past 34 years, has been named vice-president and a director of the Standard Oil Development Co., succeeding DR. NATHANIEL E. LOOMIS, who retired recently after 32 years with the company.

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P. E. H. LEROY, vice-president in charge of finance for the Goodyear Tire & Rubber Co., has been awarded a 30-year service pin by the company.

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HARRY G. SMITH, formerly associated with the Meter Division of the A. O. Smith Co. of Los Angeles, Calif., has been named vice-president and director of sales for the Ohio Injector Co., Wadsworth, Ohio.

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CHESTER F. CONNER, manager of industrial products sales for the B. F. Goodrich Co., recently marked the completion of 40 years of company service.

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WARD W. KILLION, assistant sales manager of the Sundries Division of the Tyer Rubber Co. since April, 1948, has resigned his position with the company.

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LEONARD ROCKSTROM, formerly director of engineering for F. X. Hooper Co., Inc., Glenarm, Md., has joined the Cameron Machine Co., Brooklyn, N. Y., as chief engineer. He will be responsible for all new design and development work on slitting and rewinding machinery.

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HOWARD L. HYDE, formerly general counsel and assistant secretary of the Goodyear Tire & Rubber Co., has been elected a vice-president of the company. He will continue as general counsel.

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HARRY E. OBER, formerly associated with the General Electric Co., has joined the Norton Rubber Co., Worcester, Mass., as rubber technologist for the Organic Wheel Division.

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JOSEPH A. CAPPI, associated with Electric Auto-Lite Co., and predecessor companies since 1925, has been elected a vice-president of the company to serve in the Production Division.

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WILLIAM H. LYCAN, director of research for Johnson & Johnson, New Brunswick, N. J., has been elected a director of the company.

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JOHN P. WITHERS, who served as a coordinator on the synthetic rubber chemicals program with the Petroleum Administration for War, and who more recently has been associated with the Chemical Products Division of the Standard Oil Co., has joined the Morton Chemical Co., Greensboro, N. C. The name of the concern is being changed to the Morton-Withers Chemical Co.

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**Elected Executive Vice-President**

**Franklin Farrel, III**

Franklin Farrel, III, formerly secretary and assistant treasurer of Farrel-Birmingham, Inc. Ansonia, Conn., was elected executive vice-president of the company at the recent annual meeting of the board of directors. Mr. Farrel is the fourth generation of the Farrel family in the management of the company founded by Almon and Franklin Farrel, Sr., in 1848. Entering the employ of the company in 1933, after graduating from Yale University in 1931, he worked for several years in various departments before becoming foundry manager in 1937, when he was also elected to the board of directors. In 1941 he was named assistant manager of manufacturing, and in 1943 was appointed plant manager of the Ansonia-Derby plants. The following year he was elected assistant treasurer, and in 1945 became assistant to the president and secretary of the company. Joseph LeMay, former general controller of the company, was elected secretary and assistant treasurer at the meeting. Mrs. Wiliford Whiteside, associated with the company for many years, was named assistant secretary. All other officers were reelected. At a stockholders meeting preceding the board of directors meeting, all directors of the company were reelected.

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**Named American Correspondent**

Frederic Popper of 993 Whittier Avenue, Akron, Ohio, one-time editor of *Gummi und Asbest Zeitung* of Vienna, Austria, has been named American correspondent of the German technical journal, *Gummi und Asbest*, published in Stuttgart. In his new assignment, Mr. Popper will report on technical, commercial and financial developments in the American rubber and asbestos industries.

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EDGAR F. GUILLOT, who was formerly associated with Johnson and Johnson, the Carborundum Co., and the Dunlop Tire & Rubber Co., and who joined Filtration Engineers, Inc., Newark, N. J., in 1945, has been named assistant sales manager of the latter company.

### Blair Joins Columbia Chemical

Richard R. Blair

Richard R. Blair, formerly associated with the Goodyear Tire & Rubber Co. at Akron and with the Rohm and Haas Co. at Philadelphia, has joined the Columbia Chemical Division of Pittsburgh Plate Glass Co. as technical representative on rubber pigments. He will serve the midwestern states, with headquarters in the Tribune Tower Building, Chicago. Mr. Blair is a graduate of Franklin and Marshall College with a B.S. in Chemistry. He is a member of the A.C.S., the Akron Rubber Group, Phi Sigma Kappa, and the Air Force Association.

### New Asbestos-Glass Fabric

Production of a new asbestos-glass fabric for curtains and draperies for public buildings has been announced by the U. S. Rubber Co., New York 20, N. Y. Designed to be decorative as well as fire-resistant, the new fabric is composed of glass yarns interwoven with the company's asbestos yarns known as Asbeston. The resulting fabric will not support combustion, due to its high percentage of glass and asbestos fibers, the company said. Asbeston-glass is produced by the company in the form of gray goods and is available to converters for dyeing and printing in a variety of patterns and colors. The yarn is spun at the company's Asbeston plant at Hogansville, Ga. Light in weight, the fabric is extremely stable under atmospheric changes and has high strength, low stretch and good resistance to abrasion.

### Geschwind to Handle Koylon

Formation of the Geschwind Foam Rubber Co., Inc., 70 Commercial St., Brooklyn, N. Y., to handle the sale of Koylon Foam, foam rubber manufactured by the U. S. Rubber Co., was recently announced by Nathan Geschwind, president of the Geschwind Feather Co., Inc., Brooklyn. The new company will make Koylon Foam available to upholsterers in the form of solid sheets, as slabs, and in the form of "cored slab" sheets. It will also offer the foam in the form of molded cushions, ready for use in standard size five-inch and six-inch cushions.

### French Institute Offers Booklets

The French Rubber Institute, 42 Rue Scheffer, Paris 16e, France, recently made available a number of booklets, pamphlets, reprints, etc., on various aspects of rubber technology. A number of these new publications represent reprints of material originally appearing in *Revue Generale du Caoutchouc*. The publications are in French only and copies can be secured on request to the Institute. English titles of the recently-issued publications follow:

Possibilities of Improving the Quality of Raw Rubber, by M. Bocquet.

Progress in the Drying of Rubber Sheets, by I. Sibiriakoff.

The Technique of Drying and Smoking, by A. Thomas.

Preparation of Soft Rubber, by I. Sibiriakoff.

The Plantations in Indo-China in 1940, by M. Bocquet.

Educational Courses of Rubber in France, by Jean Le Bras.

Thermosensitivity of Hevea Latex: Natural Degradation of Ammoniated Latex, by Francis Lepetit.

Thermosensitivity of Hevea Latex: Thermal and Biochemical Degradation of Ammoniated Latex, by F. Lepetit and M. Hooreman.

Mooney or Williams Plasticity?, by P. Cassagne.

Softening of Rubber with Solvents, by Jean Le Bras and Patrice Compagnon.

Molding Rubber Articles from Latex, by A. Jarrijon.

Bonding of Rubber to Metal, by Jean-Georges Duval and Jacques Gossot.

In the Rubber Laboratories of the United States, by Jean Le Bras.

Statistical Calculations and Physical Tests of Rubber, by Philippe Lapadu-Hargues.

Notes on the Bonding of Plastic Materials and on the Bonding of Rubber to Plastic Materials, by A. Jarrijon and J. Gossot.

Remarks on the Action of Benzoylperoxide on Natural Rubber in Solution, by Patrice Compagnon and Andre Delalande.

Test on the Use of the Chassaing Bag for the Shipment of Latex, by Patrice Compagnon.

Adhesion Coefficients of Rubber, by Pierre Thirion.

Some Views on Rubber in the United States, by Jean Le Bras.

Development and Progress of Rubber on the Plantation, by Andre Jarrijon.

### U. S. Rubber Accidents Decline

U. S. Rubber Co. had fewer lost-time accidents in 1949 than any year on record, according to figures recently released by Ernest W. Beck, supervisor of safety for the company. Lost-time accidents for the year totaled 347. The lowest previous figure was 522, recorded in 1948. There were 614 lost-time accidents in 1947, 693 in 1946, 858 in 1945 and 972 in 1944. The company has been keeping safety records since 1921, a year in which there were 1,080 lost-time accidents. The company's accident frequency rate in 1949 was 4.04 compared with 5.05 in 1948.

### Transferred to New England

John Guilliams

John Guilliams, formerly of Evanston, Ill., has been named representative for the Chemical Division of Goodyear Tire & Rubber Co. in the New England states. Mr. Guilliams, who has been in the Akron offices of the company since 1948, will headquarter at Boston, working with John Hussey, district manager. A graduate of Northwestern University, with his college work interrupted by three years in the Air Corps, Mr. Guilliams joined the Goodyear organization following his graduation.

### Geon 200 X 20 Vinyl Resin

A new vinyl resin said to offer great economies in the field of solution-applied coatings has been announced by the B. F. Goodrich Chemical Co., Cleveland 15, Ohio. Designated Geon 200 X 20, the product is a vinyl-vinylidene chloride copolymer unique among commercial vinyl resins because of its solubility directly in toluene, xylene, and high aromatic naphthas. Solutions ranging up to 50% total solids content can be prepared readily with Geon 200 X 20 by addition of the resin slowly to the solvent at ambient temperatures with rapid mechanical agitation. Possessing excellent stability, even high solids solutions may be cooled to 0° C. and, upon warming to normal room temperature, recover original viscosities with no gelling. The product also has excellent chemical and water resistance. Geon 200 X 20 lends itself to application by any of the conventional techniques. Solutions may be brushed, sprayed, roller coated, or, in the higher viscosity ranges, knife or bar coated.

### German Synthetic Waxes

A study of German synthetic waxes by the Office of Technical Services of the U. S. Department of Commerce has been translated by S. S. Cosman and reviewed by P. F. Dewey. The report, PB-34727, contains the formulas, procedures for manufacture and applications of the I. G. (Gersthofen) waxes. Copies may be obtained from P. F. Dewey, 1118 Watts Ave., University City, Mo., at a cost of $10.00.

# NEWS IN BRIEF

Wright Manufacturing Co., Houston Texas, has issued a handy useful guide of information on dimensions, colors, applications and availability of rubber tile. The information is furnished in tabulated form for ready reference.

Kleinert Rubber is redesigning all of its packages for greater ease of handling at notion counters. The company's 1950 line will include a new type dress shield with piercing snap fastener and screen printed rubber swim caps.

National Association of Manufacturers has published a 46-page brochure covering "Tips in Trade with Marshall Plan Countries." The brochure explains how to go about getting orders financed with ECA funds, discusses the future of ECA-financed business, and lists the forms of ECA assistance available to small business.

Anchor Rubber Products, Cleveland, is currently using Tuf-Bord cartons designed and produced by the Robert Gair Co. for packaging its heavy rubber and metal motor mounts. Tuf-Bord is a new extra strong and rigid folding paperboard said to be particularly suited for packaging durable goods and to prolong shelf life of packages in stores.

Godfrey L. Cabot, Inc., Boston, has issued a new four-page brochure briefly outlining the numerous products the company is offering to industry. Products mentioned include carbon blacks, solvents, softeners, plasticizers, frothing agents, charcoal, aluminum oxide, and chlorophyll. Typical properties of Cabot carbon blacks are included.

Bassinet covers made of Vinylite are currently being marketed by Kantwet Products, Newton, Mass. They are available in pink, blue, and yellow, with white plastic lace trimming. Quilted Vinylite lining is also being offered by the company.

The Chicago offices of the Glyco Products Co., Inc., have been moved to the Tribune Tower Building, 435 No. Michigan Avenue. The new telephone numbers are WHitehall 4-5747 and 5749. Dr. George H. Goodyear is in charge.

A new information bulletin on embedded wire resister types of electrically heated rubber has been published by Goodrich. It answers many questions on properties and applications.

St. Clair Rubber Co., Marysville, Mich., recently received the Liberty Mutual Insurance Company Accident Prevention Award, the fifth Michigan installation to receive the award. Frequency of lost time accidents was reduced 60.7% over a year's time.

A technical report on "Exposure Cracking Inhibitors for GR-S Compounds" has been issued by the DuPont Rubber Chemicals Division. The report indicates that a combination of Heliozone and NBC will economically protect GR-S stocks from exposure cracking under either dynamic or static conditions. Ask for Report No. BL-234.

The firm of Dorothy Draper, Inc, has been retained by Comprehensive Fabrics, Inc., national distributor of Koroseal for Goodrich, to style as well as to develop additional end uses for Koroseal fabrics.

Lira, an infra-red analyzer for measuring atmospheric contamination and precise process control, is the subject of a new 4-page illustrated brochure published by the Mine Safety Appliances Co, Pittsburgh, Penn. Each Lira instrument is custom built for its specific application.

Reliable spectrophotometric data should now be more easily obtained with the aid of a new booklet issued by the National Bureau of Standards Entitled "Spectrophotometry," the booklet details the techniques and data resulting from the Bureau's extensive experience.

Kellogg Co., Jersey City, N. J., plans the early introduction of Kel-F, the company's high temperature thermoplastic, in suspensoid form for application by spraying, dipping or other coating methods. Full information will be released in the near future.

A liquid vinyl plastic made by the B. F. Goodrich Chemical Co. was utilized to send Christmas trees to Navy bases in the South Pacific. Silver-tipped red firs, cut months in advance, were coated for preservation with the liquid plastic which forms a transparent coating over the trees, sealing in the moisture present in boughs and needles.

National Adhesives, New York, reports mounting enthusiasm for the use of its cold "resyn" adhesive for adhering polyethylene film to both regular and bleached kraft paper.

Three separate reprints on friction, covering classical laws, molecular forces, and electrical theory, have been made available by the Franklin Institute, Philadelphia. Requests should be addressed to Henry B. Allen, director of the Institute.

C. W. Greene Products Co., of North Baltimore, Ohio, recently changed its name to the Norbalt Rubber Products Co. The firm manufactures miscellaneous rubber products, including radiator hose.

Two new catalogs describing the company's lines of esters and synthetic waxes have been made available by the Glyco Products Co., Inc., Brooklyn 2, N. Y. Chemical, physical and use data are included in each catalog.

A new four-page folder describing the Stokes No. 741 completely automatic plastics molding press has been issued by the F. J. Stokes Machine Co., Philadelphia 20, Penna. Views of typical plastic parts molded on the press are included.

The line of "Portelvator" portable elevating tables, which lift, lower and transport, is described in a new bulletin recently issued by the Hamilton Tool Co., Hamilton, Ohio. Ask for Bulletin No. P-50.

The use of Calcene T as a low cost replacement for some thermal blacks is covered in a technical bulletin made available by Columbia Chemical. Ask for Pigment Data Bulletin 50-1, dated January, 1950.

Total manufacturers' sales in the United States in 1949 were $213,000,000,000, about 6% below the previous year, according to the Department of Commerce. The decline represented lower prices as well as some drop in volume.

A new and enlarged edition of the handbook entitled "Principles and Practice of Flow Meter Engineering", the seventh since the book was first published in 1930, has been issued. Copies are available from the Foxboro Co. Foxboro, Mass., at $7.00 each.

Aldrich Pump Co., Allentown, Penna., has issued a six-page data sheet giving full information on its new 5-inch stroke triplex direct flow pump. Information presented includes construction and design, specifications, dimension drawings, selection chart and table, and drive specifications.

An explanatory bulletin on the new Flame-otrol combustion safeguard for oil and gas fired furnaces, ovens, boilers, kilns and other heating equipment is available from the Wheelco Instruments Co., Chicago 7, Ill.

A reprint of the paper on "A Study of Workers Exposed to Talc and Other Dusting Compounds in the Rubber Industry," which was presented before the American Industrial Hygiene Association in April, 1949, has been made available by the Firestone Tire & Rubber Co. Warren L. Hogue, Jr., and stone, prepared the report.

Michelin Corporation, American subsidiary of the Michelin Tire Co., has leased a large part of the twenty-third floor at 29 Broadway in New York City in an expansion move.

## Blanchard Named Hood President

Raymond H. Blanchard

Raymond H. Blanchard, associated with the Hood Rubber Co., Division of the B. F. Goodrich Co., Watertown, Mass., since 1917, has been elected president of the company succeeding the late C. L. Muench. Mr. Blanchard joined Hood after graduating from the Massachusetts Institute of Technology. He directed the Mixing and Reclaiming Departments and later became production superintendent. Mr. Blanchard is vice-president and a director of the First National Bank of Malden, a director of the Norfolk and Dedham Mutual Fire Insurance Co. of Dedham, and a trustee of the Melrose Savings Bank, all in Massachusetts. He is a member of the Massachusetts Institute of Technology Corp., the American Chemical Society, and the American Institute of Chemical Engineers. During World War I, Mr. Blanchard served in the Chemical Warfare Service. In World War II, he was a member of the Greater Boston War Manpower Committee and was on the National War Stabilization Board for Region I.

### Pike Names Merit Western

S. J. Pike & Co., Inc., New York 7, N. Y., has appointed the Merit Western Co. of 1248 Wholesale Street, Los Angeles 21, Calif., west coast representative of the company. Merit Western is headed by George Steinbach, formerly associated with H. M. Royal Co., and former owner of the Atlas Sponge Rubber Co. of Los Angeles. The Akron representative of the Pike company is Tanney-Costello, Inc. The New York staff of the organization has been joined by George Jatinen.

### Increasing Tire Rayon Capacity

A program for increasing tire rayon capacity at its Painesville, Ohio, plant by 3,000,000 pounds annually, has been announced by the Industrial Rayon Corp., Cleveland 14, Ohio. Completion of the program, scheduled for early this summer, will bring the company's aggregate productive capacity to 88,000,000 pounds a year.

## LABOR NOTES

Sunday production of tires for the first time since the war was started by Goodrich on April 2. Tire plants in Akron, Tuscaloosa, and Oakes are now on a seven-day schedule, with all other tire plants of the company working on a six-day schedule. Seiberling Rubber has increased its weekly schedule from an average of 5½ days a week since January to a full six-day week. Reports of still higher prices are influencing tire purchases.

A new company-wide bargaining agreement between Firestone and the United Rubber Workers of America (CIO) was signed on March 18. About 20,000 employees in eight plants are now covered by a pension plan calling for $100 a month, including social security. The agreement, which runs for one year, left wage rates unchanged.

Negotiations between General Tire and the U. R. W. A. were broken off on March 22. Agreement was understood to have been reached on pension and insurance benefits, but snags were struck on other contract provisions. The negotiations covered workers in the company's Akron and Waco plants, covering about 2,500 in all.

Some 300 production workers of the Fremont Rubber Co. in Fremont, Ohio, were called out on strike on March 16 by Local 24420 of the American Federation of Labor. The strike followed a breakdown of negotiations between the company and the union. According to report, the chief issue is the union's demand for an all-union shop under which employees are required to join the union after a 30-day probationary period.

A strike at the Crown Rubber Co. in Fremont, Ohio, was called on March 23 by the Rubber Workers Union, Local 24536 (AFL), to back up demands for a 23-cent-an-hour wage increase. Contract negotiations between the company and the union were said to have been broken off about a month before the strike call.

### Geon Resin 400 X 65

Production in commercial quantities of a new Geon Resin, 400 X 65, which is expected to open up many new uses for vinyls in the field of rigid molding, has been announced by the B. F. Goodrich Chemical Co., Cleveland 15, Ohio. Possessing high thermoplasticity, great solubility and excellent processing characteristics at moderate temperatures, the new product introduces the properties of Geon polyvinyl chloride resin into another product range, where heretofore certain material limitations have restricted its use. Geon 400 X 65 can be extruded, calendered or molded in unplasticized form and at temperatures under 300° F. It has excellent heat stability, flexural strength and wear resistance, the company states.

**An index to Volume 66 of RUBBER AGE will be found on Pages 125 to 128 of this issue.**

## Powers Joins C. P. Hall Co.

H. V. Powers

H. V. Powers, a member of the rubber industry for the past thirty-four years, has been appointed to the technical sales staff of the C. P. Hall Co., Akron, Ohio. Mr. Powers, who assumed his duties with C. P. Hall on March 1, was associated with the Goodyear Tire & Rubber Co. for thirty years in production and development work. For six years he was on the staff of Goodyear's Canadian plant. During his last fifteen years with the company he specialized in raw material selection and control. Prior to joining the C. P. Hall Co., Mr. Powers had been sales manager for the J. J. White Products Co. He is a member of the American Chemical Society and the Akron Rubber Group.

### Marvinol VR-20 Vinyl Resin

Development of a new easy-processing vinyl resin for use in the manufacture of draperies, upholstery, table coverings, electrical wire and cable and many other plastics products has been announced by the Naugatuck Chemical Division of the U. S. Rubber Co., New York 20, N. Y. Known as Marvinol VR-20, the product features high molecular weight, purity, and fine particle size. Products based on Marvinol VR-20 are said to exhibit good toughness, durability, heat and light stability. In the calendering field, the new resin will eliminate or drastically reduce the need for copolymer processing aid resins. Its use will permit lowering Banbury and calender temperatures 10 to 15° below previous practice, the company claims.

### Swedish Award for Litchfield

The insignia of the Royal Order of Vasa, first class, recently conferred on P. W. Litchfield, chairman of the board of the Goodyear Tire & Rubber Co., by King Gustav of Sweden, was formally presented to Mr. Litchfield on March 27 by the Swedish King's representative, Consul General G. Oldenburg. The Swedish Government honored Mr. Litchfield for his interest during many years in developing close business relations of mutual benefit to both Sweden and the United States.

# FINANCIAL NEWS

### Seiberling Rubber Co.

For 1949: Net loss of $359,351, compared with a net profit of $467,758, or 74c a share, in 1948. Net sales in 1949 amounted to $25,338,774, against $28,414,291 the year before. J. P. Seiberling, president of the company, in his annual statement to stockholders said that the "disappointing" results in 1949 stemmed from a reduction in sales of replacement market tires by the industry which caused price cutting. Balance sheet items as of December 31, 1949, indicated current assets of $10,209,213 and current liabilities of $2,154,956, against $11,695,768 and $3,127,032, respectively, at the end of 1948.

### Thermoid Company

For 1949: Net income of $892,642, which is equal to $1.01 a share, compared with $1,040,469, or $1.20 a share, in 1948. Balance sheet items of the company as of December 31, 1949, indicated current assets of $8,123,589, and current liabilities of $3,308,537, against $8,935,349 and $4,409,133, respectively, in 1948.

### Mohawk Rubber Company

For 1949: Net profit of $296,734, which is equal to $2.09 a share, compared with $388,528, or $2.74 a share, in 1948. Net sales in 1949 amounted to $8,359,894, against $8,432,375 the year previous. As of December 31, 1949, total current assets amounted to $3,209,191 and total current liabilities to $298,595.

### Flintkote Co.

Year Ended December 31: Earned surplus of $20,133,576, against $17,802,746 in 1948. Consolidated balance sheet items at the end of 1949 indicated current assets of $30,808,048 and current liabilities of $7,613,379, compared with $29,272,813 and $9,295,226, respectively, at the end of 1948.

### Thiokol Corporation

For 1949: Net income of $73,234, compared with $52,731 the year before. Balance sheet items as of December 31, 1949, indicate total current assets of $1,006,916 and total current liabilities of $207,515, against $885,594 and $121,181, respectively, in 1948.

### American Hard Rubber Co.

For 1949: Net loss of $231,707, on net sales of $11,845,599, contrasted with a profit of $503,184, equal to $4.39 a share, on net sales of $16,378,006 in 1948.

### Collyer Insulated Wire Co.

For 1949: Net loss of $24,285, contrasted with a net income of $254,179, which was equal to $1.69 a share, in 1948.

### Columbian Carbon Co.

For 1949: Net profit of $5,955,247, which is equal to $3.69 each on 1,612,218 capital shares, compared with $6,504,865, or $4.03 on an equal number of shares in 1948. The 1949 net included a non-recurring profit of $1,429,608 from sale of stock in the Mississippi River Fuel Corp. Sales for 1949 were $38,691,178, compared with $42,920,977 for 1948. Net current assets increased during 1949 to $13,136,070 from $12,654,390 the year before.

### Raybestos-Manhattan, Inc.

For 1949: Net income of $2,047,360, which is equal to $3.26 a common share, compared with $2,563,510, or $4.08 a share the year before. Net sales for 1949 amounted to $48,770,486, against $57,331,789 in 1948. As of December 31, 1949, current assets were $21,721,536, and current liabilities were $4,438,341, contrasted with $21,762,456 and $5,501,330, respectively, the year before.

### Minnesota Mining & Mfg. Co.

For 1949: Net income of $15,398,176, which is equal to $7.60 each on 1,972,845 shares of common stock, contrasted with $13,234,756, or $6.51 each, the year before. Net sales for 1949 amounted to $114,925,274, an increase of more than six million dollars over the previous high of $108,246,410 set in 1948.

### Electric Auto-Lite Co.

For 1949: Net profit of $11,328,419, which is equal to $7.58 a share, compared with $12,196,493, or $8.16 a share, the year before. Balance sheet items as of December 31, 1949, indicate current assets of $69,853,268 and current liabilities of $23,178,786, against $73,887,621 and $27,737,111, respectively, in 1948.

### Kerite Company

For 1949: Net income, before crediting a $100,000 reserve for possible inventory price decline, of $701,036, which is equal to $5.94 a common share, compared with the 1948 net of $966,908, or $8.20 a share, before establishing a $175,000 reserve for inventory price decline.

### Denman Tire & Rubber Co.

For 1949: Net profit of $7,724, which is equal to 27 cents a preferred share, on net sales of $1,213,587, compared with $12,547, or 32 cents a preferred share, on net sales of $2,131,019 in 1948.

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### Allen Industries, Inc.

For 1949: Net profit of $1,003,082, which is equal to $1.79 each on 559,200 capital shares, compared with $1,179,949, or $2.11 each on an equal number of shares in 1948. Sales during 1949 totaled $24,794,899, against $27,174,812 in the preceding year. Balance sheet items as of December 31, 1949, indicated current assets of $5,123,059 and current liabilities of $2,126,694. At the end of the prior year, current assets were $4,753,020, and current liabilities, $2,068,095.

### General Cable Corp.

For 1949: Net income of $1,555,857, which is equal to 42 cents each on 1,917,646 common shares, compared with $4,131,742, or $1.75 each on 1,917,610 shares in 1948. Gross profit on sales in 1949, before depreciation, declined to $5,875,950 from $9,135,731 the year before. The December 31, 1949, balance sheet lists current assets at $20,860,394 and current liabilities at $7,687,738, compared with $25,299,310 and $7,067,577, respectively, a year earlier.

### St. Joseph Lead Co.

For 1949: Net inconie of $8,564,436, which is equal to $4.34 a share, compared with $9,636,737, or $4.88 a share, in the preceding year. Balance sheet items as of December 31, 1949, indicated current assets of $32,027,377 and current liabilities of $8,381,557, against $31,614,965 and $11,091,885, respectively, in 1948.

### I. B. Kleinert Rubber Co.

For 1949: Net profit of $304,087, which is equal to $1.91 each on 159,414 capital shares, against $354,682, or $2.22 each on 159,714 capital shares in 1948. Net sales for 1949 totaled $8,765,407, compared with $8,743,235 in the preceding year.

### Farrel-Birmingham Co., Inc.

For 1949: Net profit of $910,291 on net sales of $15,776,293, compared with $1,659,627, or $5.19 each on 320,060 common shares in 1948, when sales amounted to $22,317,384.

### Brunswick-Balke Collender Co.

For 1949: Net profit of $1,780,391, which is equal to $3.67 a common share on net sales of $27,773,522, compared with the 1948 net of $2,401,347, or $5.04 a share on sales of $30,487,740.

### Hewitt-Robins, Inc.

For 1949: Net income of $628,765, which is equal to $2.25 a share on net sales of $19,792,292, compared with $737,767, or $2.65 a share, on sales of $19,623,002 in 1948.

### Sheller Manufacturing Corp.

For 1949: Net profit of $3,689,812, which is equal to $6.60 a common share, compared with $2,677,288, or $4.77 a share, in the 1948 period.

# NEW RUBBER GOODS

### Rubbermaid "Shelf-Kushions"

A colorful, durable, easy-to-clean shelf cushioning has been introduced by the Wooster Rubber Co., Wooster, Ohio, under the name "Shelf-Kushions." The cushioning is designed for protection of shelf surfaces and reduction of kitchen clatter. "Shelf-Kushions" come in standard 11¾

inch width, and sets are available in 24, 30, and 36 inch lengths so they can be fitted in all kitchen cabinets, cupboards and pantry shelves. Made of durable-quality rubber, molded plate rails provide safe "footing" for plates. Raised surface ribs hold glassware up, while ribbed undercoating holds the cushioning material in place. "Shelf-Kushions" are color-fast, odorless and resistant to heat, scalding water, grease, soap, cleansers and kitchen acids. They are available in a variety of colors.

### Rubber and Canvas "Mukluks"

Rubber and canvas "mukluks" which are said to compare favorably with native Eskimo footwear in warmth are being manufactured by the Hood Rubber Co., a division of the B. F. Goodrich Co. at Watertown, Mass. The "mukluks" will be worn by Armed Forces personnel in frigid zones. The "mukluk" is patterned after the ancient Chinese principle of adding layers of clothing as the temperature falls, company officials said. Men wear one pair of light cotton and wool socks, two pairs of heavy wool socks and one pair of felt bootees inside the "mukluk." The layer idea permits "breathability" or circulation of air to the feet, a prime requisite when service personnel must keep warm in outdoor temperatures ranging far below zero.

Greater comfort for litter patients flying Military Air Transport Service air evacuation aircraft is said to be assured with the development of a foam sponge mattress and a canvas litter auxiliary. The new mattress, made by U. S. Rubber, is not adversely affected by high altitude.

### Goodyear Butyl Bicycle Tubes

A complete line of bicycle tire tubes made in black butyl is now being offered by the Goodyear Tire & Rubber Co., Akron, Ohio. The new product replaces the black natural tube previously manufactured by the firm. In explaining the change, company officials stated that the butyl tubes have superior air retaining qualities. Since many users still prefer the popular red tubes of natural rubber, however, the latter will be retained in the line, also manufactured in all sizes.

### U. S. Rubber Floor Matting

Development of a new all-purpose, decorative rubber floor matting for use in hotels, schools, churches, restaurants, theaters and office buildings has been announced by the U. S. Rubber Co., New York 20, N. Y. The new matting has a distinctive waffle-like design. It is produced in black, maroon, red or green in

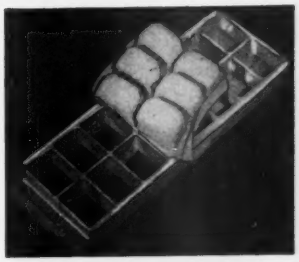
3/16 inch thickness, and 36, 48 and 52 inch widths. The matting is especially designed for areas where regular corrugated matting is too light or unattractive and perforated mats are too heavy for such service. The new matting can be laid over expensive carpeting during inclement weather to prevent tracking mud and dirt into attractive interiors. Its design also makes it easy to clean.

### Foam Sponge Presser Pads

U. S. Rubber Co., New York 20, N. Y., has reported a rapid increase in the use of foam rubber presser pads by tailors, dry cleaners and garment manufacturers throughout the country. Presser pads made of the company's Koylon foam include 38, 42 and 45-inch utility, 16 and 19-inch mushroom, and 42 and 48-inch pants type. Each pad is individually wrapped with detailed installation instructions. In addition to the foam rubber, each package contains a scorch resistant, porous Asbeston pad which is placed over the buck and cotton padding ¼-inch thick which is sandwiched between the Asbeston and the foam.

### Cube Drawer Ice Cube Tray

Cube Drawer Corp., 1301 Kentucky Avenue, Akron 14, Ohio, has developed the Cube Drawer, a patented ice cube tray which features a latex liner. The drawer consists of a die cast aluminum grid into which the latex liner is fitted. The liner forms pockets in which the cubes are



frozen, so that by pressing on the underside with one finger one or more cubes can be ejected. The new product eliminates carrying the tray to sinks, running hot water to loosen the cubes, or drying to dislodge them. Cube shattering and waste are also eliminated. The natural latex used in the manufacture of the liner is odorless and tasteless, and the liner may be washed. Dimensions of the cube tray are 4-5/16 inches wide, 11-3/8 inches long, and 1-7/16 inches high.

### Neox-Coated Protective Gloves

Edmont Manufacturing Co., Coshocton, Ohio, has announced a new "Neox"-coated glove made especially for chemical and industrial workers. The heavy, Neox coating is made from a neoprene base combined with special additives to produce a flexible, tough material with great resistance to wear. This coating is chemically welded

to a strong fabric base to achieve a glove which is said to be 25% longer wearing in heavy-duty service than ordinary coated gloves. Gloves treated in this manner give complete protection against liquids, acids, caustics, oils, greases and solvents, and are snag and tear resistant. The gloves are available in knit-wrist, gauntlet and mitten styles, coated all-over; also in a knit-wrist style with only the palm coated. These black Neox gloves are made in two weights, flexible and standard heavy.

### Ohio Rubber Expands Services

Under terms of a working agreement with the Hungerford Plastics Corporation, Murray Hill, New Jersey, the Ohio Rubber Company, Willoughby, Ohio, has expanded its services to include flexible vinyl and other thermoplastic materials used for a wide diversity of component parts and complete products. At the same time, Ohio Rubber acquired exclusive sales rights for the Hungerford "Flex-Grip" used for handle bar grips on bicycles and other wheel goods. The arrangement between the two companies makes it possible for Ohio Rubber to serve its customers in the closely related fields of rubber and plastics. Where end uses of component parts or products indicate rubber or synthetic rubber as the most practical material, Ohio Rubber's facilities will be employed. When the customer's needs indicate the desirability of flexible vinyl or other thermoplastic materials, Ohio Rubber will utilize the facilities of the Hungerford Plastics Corporation. Both companies employ advanced techniques of compounding and molding in their respective fields. The integration of the specialized activities of the two organizations is stated to offer many practical advantages to customers of Ohio Rubber.

### Goodrich Geon Resin 101 EP

An improved, easy processing Geon polyvinyl chloride resin of high molecular weight has been introduced by the B. F. Goodrich Chemical Co. Designated Geon resin 101 EP, the new product is available in commercial quantities and should prove of special interest to those processors who wish to maintain low operating costs through high rates of production. Geon 101 EP resin is particularly adaptable to both Banbury and powder mixing. Tests run in a high speed 3A Banbury showed a 25% reduction in cycle time with unloaded stocks and a 50% reduction with loaded stocks. Powder mixing tests conducted on a Muller type mixer showed reduced cycle time of 50% in producing a dry-free flowing powder. In mill mixing, Geon 101 EP resin does not effect great reductions in cycle time; however, savings of 10 to 20% can be achieved with correct mixing procedures. In both calendering and extruding with Geon 101 EP, lower processing temperatures may be used than with regular Geon 101, a 5° F. reduction in calendering and a 20 to 30° F. in extruding.

### Frigid Zone Rubberized Fabric

Rubberized fabric, capable of giving useful service in temperatures of more than 85° F. below zero, has been developed by the B. F. Goodrich Co., Akron, Ohio. The fabric, impregnated with a special type of synthetic rubber, is being used in a new type of exposure suit for members of the Armed Forces. Goodrich supplies the rubberized fabric and another company fabricates the clothing. Since the end of the war considerable research and development has been directed to find new compounds which would assure service from rubber products at extremely low temperatures. This new fabric is one important result of that undertaking, Goodrich officials said.

### Posey Latex Foam Doll

Johns-Lee Co., 1341 East Creighton Avenue, Fort Wayne, Ind., is manufacturing "Posey," a foam rubber doll 18 inches high, unbreakable, washable, light weight and colorful. She has red or blonde hair and is dressed in a bright yellow and green romper suit and green

shoes. Her rubber paint is said to withstand all kinds of wear and she suffers no ill effects after going through a wringer. "Posey" can also be tied in knots, and her wired limbs will remain in any set position. Johns-Lee is also featuring "Honey Bun," a foam rubber rabbit with wide appeal for the younger set.

### Crush-Proof Gasoline Hose

Development of a soft, crush-proof gasoline hose for use on curb pumps at filling stations has been announced by the U. S. Rubber Co. The new hose is said to be lighter, more flexible and easier to handle then helically woven wire hose normally used on curb pumping units. It is constructed of an oil-resistant synthetic rubber tube, two braided plies of high strength rayon cord with a built-in static wire and a sun and age-resisting neoprene cover. The hose is being marketed in sizes of ¾-inch and 1-inch inner diameter and in standard lengths. It is available with either replaceable compression spring fittings or the newly-developed non-replaceable couplings.

### Thailand Rubber Factories

The Government of Thailand has taken the first steps towards improving the quality of rubber exports from the country. It is building three "model factories" in the rubber district of Trang in South Thailand, whose output will serve as examples for small holders in processing of sheet rubber.

A technical bulletin on the use of reclaim in a first quality cold rubber tread has been made available by Midwest Rubber Reclaiming Co. The evaluation covers M-461, a first quality peel reclaim, and Midco, a first quality whole tire reclaim. Ask for Report No. 13.

### Rigid-Walled Wading Pool

U. S. Rubber Co. is now producing a new rubber wading pool for children called U. S. Royal Rigid-Aire. The pool is made by a new method, with firm side walls 10 inches high that will not collapse when children sit on them. The walls are made of two layers of cotton fabric, connected by thousands of interconnecting threads. The space between becomes the inflation chamber. Neoprene coating of the fabric adds resistance to sun, air and sun tan oil. To provide maximum safety during play, the only metal part used is a protected metal inflation valve. A rough finish on the floor prevents slipping. The pool can be inflated with a hand tire pump in three minutes and deflated as quickly. It weighs 13½ pounds and can be folded compactly for carrying. It is 54 inches in overall diameter, with a water capacity of 98 gallons. Four children can play in it comfortably. U. S. Rubber is also producing a smaller rubber wading pool, that is shaped like an automobile inner tube. The tubular inflation chamber is eight inches in diameter. Outside diameter is 54 inches, and the unit has a water capacity of 45 gallons. This pool weighs 7 pounds and 12 ounces.

### Introduce Stabelan E Stabilizer

Stabelan E, a new stabilizer in paste form for high temperature, ultra-violet and outdoor aging of vinyl stocks, has been introduced by the Stabelan Chemical Co. for sales distribution through the Harwick Standard Chemical Co. of Akron. The new material is designed for use in vinyl plastisols, organisols and emulsions, as well as in regular milled and calendered vinyl films. It is reported to increase light-fastness and clarity in vinyl films, and improvement has also been noted in the flexing and folding properties of these films. It does not interfere with heat sealing nor subsequent printing on the film.

### Improved Good-rite Plasticizer

The B. F. Goodrich Chemical Co. has announced that several notable improvements have recently been made in its new dioctyl phthalate plasticizer. The product, Good-rite GP-261, is now odor free, has low acid number and crystal clear color. Available in commercial quantities, the material was first introduced last year as a plasticizer for vinyl and synthetic resins in addition to nitrile type rubbers. The new improvements are reported to have been obtained with no sacrifice of other plasticizer properties, the most outstanding of which is its excellent electrical characteristics.

### Martin Rubber Expands Plant

Martin Rubber Co. has recently completed the second addition, within a two year period, to its plant at Long Branch, N. J. The additional space will permit the manufacture and storage of a greater number of Martin Rubber pitching horseshoes and quoit games.

# LOS ANGELES NEWS

The past chairmen of the Los Angeles Rubber Group sponsored an interesting technical and dinner meeting on March 7, at the Mayfair Hotel in Los Angeles. At the technical meeting, which preceded the dinner meeting, C. M. Boswell, of C. M. Boswell and Associates, Los Angeles, addressed the group on "Why Gamble with Quality." W. C. Mullendore, president of the Southern California Edison Co., spoke on "How Much is Left of the Free Enterprise System."

In his address, Mr. Boswell stated that the science of statistics is assuming an increasingly important role in the quality control problems of industry. The basic reason for this is that nothing is ever reproduced exactly the same every time. Variation is inevitable in the products and processes of industry and one of the major functions of statistics is to measure these variations to determine their significance. By providing a precise measure of variability, certain definite predictions can be made, with a minimum of risk, concerning the behavior of the quality characteristics of a product and/or the process that produced it. The main contribution of statistics to the industrial control function is the replacement of an accurately calculated risk for the gamble that previously left predictions to rules of thumb and educated guessing.

The speaker used two typical cases, drawn from industry, to illustrate the consequences of gambling with quality without knowing the risk involved. The first example concerned lot sampling. He showed how the common practice of 10% sampling used to determine lot quality, will result in the acceptance of 67% of all lots of 50 pieces that are 8% defective because 67 out of 100 samples of five would show no defectives. Lots of 100 containing the same percentage of defectives would be accepted 45 out of 100 times from the evidence of a 10% sample. Under these conditions flipping a coin could be substituted for inspection with about the same risk since only half the lots would be accepted.

The second case outlined the problems that face a machine operator when he is forced to draw conclusions about the quality of the product he is producing from a small check sample drawn periodically. He must decide what the quality is now, what it was since the last check and what it will be until the next sample is taken. In addition he must decide whether to adjust the machine or to leave it alone.

The operator has no way of knowing when the variations from sample to sample are due only to the laws of chance and are inherent in the sample itself, the machine and the materials being processed. Therefore he is forced to guess which adds another source of variation to the process which is often much greater than all the other variables in the process combined. The reason for this is that the operator often makes adjustments when he shouldn't and vice versa from the erroneous evidence of the sample.

Statistical quality control is a tool which separates variations into categories, those that can be accounted for only by the laws of chance and all others that must arise from some other cause. With this comparatively new tool, inspectors and machine operators can draw definite conclusions about the quality of the product from samples and with a minimum of risk. They no longer need to depend on rules of thumb or to gamble by guessing, he concluded.

At ceremonies preceding the dinner meeting, the past-chairmen, dressed in white dinner jackets with colorful camellia boutonnieres, made a grand entrance and seated themselves about a gaily decorated banquet table. This came in marked contrast to the settings prepared for the present officers and directors of the group who were forced to eat meager fare off bare pineboard.

Ray Stringfield (Fullerton Mfg.) acted as master of ceremonies and presented each of the past chairmen. For the benefit of the younger group members, a resume of the growth and development of the organization was offered.

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L. E. "Bud" Budnick (Ohio Rubber) and his wife entertained the directors of the Los Angeles Rubber Group with a special Italian dinner at their home on March 13.

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The Los Angeles Rubber Group held its 1950 season Inaugural Golf Tournament on March 17 at the Fox Hills Country Club. Winners of the different events included: *Blind Bogey*—John Ballesio, Bob Roby (Accurate Products), and Al Federico (C. P. Hall); *Low Net*—Hal Crosky; *Fewest Putts*—A. L. Pickard (Braun); *Low Gross*—Dick Grand; *Most Accurate Tee Shot*—Dick Kress; *Longest Drive*—George Gregory. Walter Del Mar (Adamson United) received a book on "How to Play Golf" because of the eight strokes he took on the 12th hole.

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Wyatt King, formerly associated with the Firestone Tire & Rubber Co., has joined the sales department of the Kirkhill Rubber Co.

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The Goodyear Tire & Rubber Co. sponsored the April 4 meeting of the Los Angeles Group. Ross E. Morris, chief rubber technologist of the Mare Island Naval Laboratory, addressed the group on "The Behavior of Rubber Gaskets at Low Temperatures." Brigadier General Thomas H. Chapman of the Air Forces also addressed the group. General Chapman spoke on "Air Force Procurement on the West Coast." A complete report on the April 4 meeting will appear in the May issue of RUBBER AGE.

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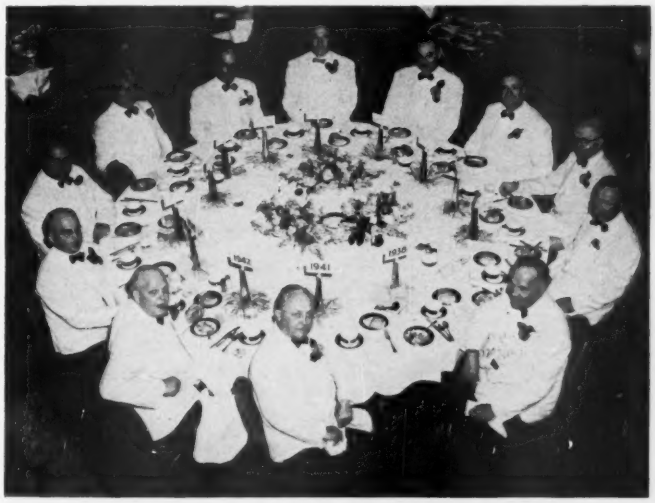
Earl A. Hensal, associated with the B. F. Goodrich Co., has been transferred to the Goodrich plant in Kitchener, Ont., Canada, where he will be in charge of all tire and tube production.




*Past-chairmen of the Los Angeles Rubber Group who sponsored the group meeting on March 7. Seated clockwise from center-front are: L. L. Horchitz, 1941; G. K. Norton, 1942; C. J. Roese, 1943; A. L. Pickard, 1944; C. M. Reinke, 1946; C. R. Wolter, 1947; P. W. Drew, 1948; C. H. Churchill, 1949; R. B. Stringfield, 1928; A. F. Pond, 1929; T. Kirk Hill, 1937; and E. L. Royal, 1938.*

# CANADIAN NEWS

Automobile tires continue to absorb about 70 per cent of all rubber consumed by Canadians, and the tire manufacturers are convinced that natural rubber is more suited to Canadian needs than the artificial or "cold" rubber tires.

A recent survey of the rubber industry indicated that more natural than cold rubber is being used. No tires made entirely of either product are now sold, but in the composition of nearly all Canadian tires the natural rubber content is larger.

Tire manufacturers say that Canadian climatic conditions explain the preference, which is quite different to that of many U. S. tire manufacturers whose customers drive in a higher mean temperature range.

During the recent war both defense and domestic rubber needs were met by synthetic rubber production. Canada is still making synthetic rubber in volume, and in some improved types. But the rubber industry has recently urged Ottawa to create a national stockpile of natural crude rubber.

"Cold rubber is good," one tire manufacturer told the RUBBER AGE correspondent recently, "but in a cold war there are valid reasons for stockpiling natural rubber against emergency needs."

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Polymer Corporation of Sarnia, Ontario, the Canadian Government-owned synthetic rubber plant, is feeling the competition from natural rubber, but seems to be making a fight for its share of the market.

Polymer lost an appeal recently against a freight rate increase which it claimed favored natural rubber. The Board of Transport Commissioners at Ottawa said it was quite apparent that Polymer wasn't seeking a reduction in rates on the merits of its case, but simply that it might be in a better position to meet natural rubber competition.

Eighty per cent of Polymer output goes to Kitchener, Hamilton, and Toronto, Ont. Much of it is trucked, and it seems that the truckers set their rates at just about the rail rate on natural rubber from the docks at Montreal.

In 1947, synthetic rubber supplied 47.5 per cent of the total used in Canada. This had dropped to 33 per cent early in 1948, but consumption figures indicate Polymer is regaining a larger share of the market. Average monthly consumption of rubber in Canada was, in long tons, in 1949: natural, 3,192; synthetic, 1,505; reclaimed, 983. Value of natural rubber imports declined in 1949 to $13,488,672 from $17,115,407 in 1948.

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The labor dispute between the management of the Polymer Corporation at Sarnia and Local 14 of the United Chemical Workers Union (CIO) has been placed in the hands of an arbitrator. The union recently rejected the findings of a conciliation board and voted to strike against the Crown-owned corporation. The union had demanded an increase of 10 cents-an-hour across the board and 5 and 10 cent shift differentials. The conciliation board recommended increases of 6 and 7 cents an hour and shift differentials of 3 and 6 cents an hour. Justice G. A. Gale of the Supreme Court of Ontario has been named as arbitrator.

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A. Beverley Lewis, who has served as technical director of the British Rubber Co., Ltd., for the past ten years, has left that company and has joined Armstrong Cork Canada, Ltd., as production manager of the Montreal plant. Mr. Lewis, an engineering graduate of the University of Toronto, has been associated with the rubber industry for the past 14 years. For many years he was a member of the board of directors of British Rubber, recently resigning that post. At the same time Armstrong Cork announced that J. A. Wright, who has been with the company since 1927, has been made assistant general manager.

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Seiberling Rubber Co. of Canada, Ltd., reports net profit of $22,149, or 44c per share for 1949, against $90,514 or $1.81 per share for the preceding year. The balance sheet indicates net working capital of $1,369,368, compared with $1,285,519.

Marcus L. Brown, president, states competition was keener than was anticipated. There was some relief during part of the year from lower crude rubber prices, but this was offset by increased costs, due to devaluation of the dollar. Volume of sales was less than in 1948, particularly in the export field. The company expects continued sharp competition, but anticipates results for 1950 will be better than for 1949.

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The Dunlop Tire & Rubber Goods Co., Ltd., has announced it will soon begin the manufacture of its aviation products in Canada. J. Wright, general manager of the company's aviation division, said production of the company's full line of engineering equipment would start at once, while manufacture of aviation tires is planned for the "near future." Actual manufacture will be assigned to Dowty Equipment of Canada, Ltd., at its Ajax, Ont., plant. Dunlop technicians from the company's head office in the United Kingdom will supervise the initial work.

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The Atlas Powder Co., of Wilmington, Delaware, and G. F. Sterne & Sons, Ltd., of Brantford, Ontario, have joined forces to organize the Atlas Powder Company, Canada, Ltd., with headquarters at Brantford. W. S. Sterne is president and F. E. Sterne is managing director of the new company, the facilities of which will include research, manufacturing, sales and distribution of all Atlas industrial chemicals. Chemicals to be made include polyhydric alcohols, sorbitol and mannitol, and a wide variety of surface active agents, such as emulsifiers, detergents, wetting agents, solubilizers, and dispersing agents. G. F. Sterne & Sons, Ltd., have been the Atlas chemicals representative in Canada.

**A. Beverley Lewis**
*joins Armstrong Cork of Canada*

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F. C. Bingham, formerly sales manager of the Ontario regional office of Canadian Durex Abrasives, Ltd., has been named executive assistant at the head office of the company in Brantford, Ontario. Among several new appointments recently announced by the company was that of D. M. Steiner as sales manager of the adhesives and coatings division.

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J. E. Hallonquist has been appointed Sales Manager, Tire Division, Dunlop Tire & Rubber Goods Company, Ltd. Mr. Hallonquist was formerly Divisional Manager for the Company at Calgary and will now make his headquarters in Toronto.

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The Canada Wire and Cable Co. has reported a net income of $1,297,483 for the year of 1949. This is equal to $7.82 a Class B common share and compares with $1,364,771, or $8.27 a share, reported for the previous year.

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The Canadian High Polymer Forum will hold a conference at the National Research Council buildings in Ottawa on June 15 and 16. Dr. J. S. Tapp, of the Polymer Corporation, Sarnia, is secretary of the Forum and papers intended for presentation should be sent to him as soon as possible.

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J. Edgar Hill has been appointed factory superintendent for the Montreal plant of National Adhesives (Canada) Ltd. Mr. Hill was formerly technical director of La Quimica Cia Industrial and Gelatines Argentinas in Buenos Aires.

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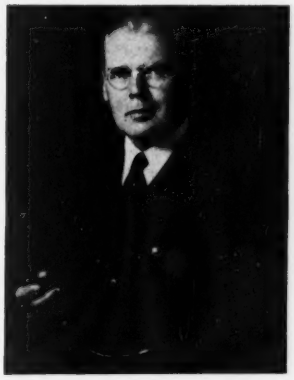
**An index to Volume 66 of RUBBER AGE will be found on Pages 125 to 128 of this issue.**

# OBITUARIES

### C. Lawrence Muench

C. Lawrence Muench, president of the Hood Rubber Co., Watertown, Mass., a division of the B. F. Goodrich Co., died suddenly on March 6 at Mt. Auburn Hospital in Watertown. He was 56 years old. Born in Somerville, Mass., in 1894, Mr. Muench was graduated from Arlington



High School in 1911 and from Amherst College in 1915. He joined Hood in 1918 in the Production Planning Department. Two years later he was appointed merchandising manager. He became sales manager in 1927 and executive vice-president in 1939. He was appointed president of Hood in 1940.

Mr. Muench, a past president of the Boston Chamber of Commerce, served as an industry member of the Regional War Labor Board during World II. He was divisional chairman of the Red Cross Campaign and of the Boston Community Fund in 1945. He served as a director of the Boston Chamber of Commerce from 1946 to 1948 and was president in 1948-49. He was also a member of the executive committee. Last fall, Mr. Muench was elected president of the Associated Industries of Massachusetts, a position he held until his death.

Mr. Muench was a director of the Sanborn Co. and of the Union Market National Bank. The day before his death he was elected a director of the National Shawmut Bank of Boston. Mr. Muench was a member of Delta Kappa Epsilon fraternity and was vice-president of the Amherst Alumni Association. He was also a member of the Algonquin Club of Boston and the Oakley Club, Belmont, Mass. He is survived by his wife and mother.

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**An index to Volume 66 of RUBBER AGE will be found on Pages 125 to 128 of this issue.**

### Frank Fenton

Frank Fenton, production manager of the Sun Rubber Co., Barberton, Ohio, died at his home in Akron on March 21 after an illness of two and one-half years. He was 62 years old. A native of Wadsworth, Ohio, Mr. Fenton came to Akron with his parents as an infant. He attended Coventry School in that city. He was first employed with the B. F. Goodrich Co. In 1915 he went with the old Miller Rubber Co. as night superintendent. Mr. Fenton was with that company when it was taken over by Goodrich and remained there until 1940. For a year after leaving the Miller Division, he was associated with the late Dr. M. M. Harrison and Dr. Harold Morton, rubber chemists. He then went to California, where, at the outbreak of World War II, he became general manager of the Voit Rubber Co. Returning to Akron in the fall of 1942, Mr. Fenton joined the Sun Rubber Co. He had been on leave of absence from the company for the past two and one-half years. Funeral services were conducted on March 24 at the Billow Funeral Chapel in Akron with burial in Rose Hill Cemetery. His widow and son survive.

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### Kennedy Hassenzahl

Kennedy Hassenzahl, rubber dealer and importer, died on March 19 in the Beekman Downtown Hospital in New York City. He was 59 years old. Mr. Hassenzahl, who was a member of the firm of Farr & Co., New York, N. Y., served on the board of finance of Westport, Conn., where he resided. He was active in local political circles. Born in Reddington, Ind., Mr. Hassenzahl was a veteran of both World Wars. He commanded the Gopher Ordnance Works, Rosemont, Minn., in 1942 and then spent two and one-half years in the China theater. He organized units for training Chinese forces in the use of American equipment and made a survey of Indo-China for the Rubber Control Administration. He held the rank of colonel at his discharge. Mr. Hassenzahl received the Legion of Merit and the Bronze Star. He was an honorary general in the Chinese Army. He leaves his wife and daughter.

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### Frank M. Potter

Dr. Frank Maxon Potter, vice-chairman of the board of directors and retired vice-president of the General Cable Corp., died on March 18 in Rome, N. Y. He was 76 years old. Born in Newark, N. J., Dr. Potter came to Rome in 1905 as vice-president of the Wire & Telephone Co. of America, which he had helped to form that year. During the first World War he was a member of the Division of Military Aeronautics and civilian executive in charge of the engine and plane maintenance branch in Washington.

### William M. Morse

William M. "Bill" Morse, former editor of the *India Rubber World*, died on March 1 in Dunedin, Fla., after a long illness. Born on March 26, 1871, in Waverly, N. Y., Mr. Morse died a few weeks before his seventy-ninth birthday. He attended the public schools of Chicago, Ill., and attended Manual Training School and Metropolitan Business College there. He also

attended evening classes at the Chicago Athenaeum, studying mechanical drafting and machine design.

For four years Mr. Morse served as an apprentice machinist in Chicago and later became assistant superintendent of the Miehle Printing Press & Mfg. Co. In 1893, Mr. Morse was employed as a salesman for the Troy Laundry Machinery Co., and had charge of its exhibit at the Columbian Exposition in Chicago. It was during this period that Mr. Morse met with the accident that cost him his right arm. He was next employed as salesman and as manager of the Chicago branch of Alden Speare's Sons Co.

Mr. Morse then began his career in the rubber industry. In 1903 he went to Panama and optioned a 500,000-acre tract of *Castilloa elastica*-bearing land from which he shipped rubber to New York. He negotiated the purchase of this property with capital secured in Boston, Mass., and operated under the name of the Boston-Panama Co. Eventually, the tract was turned over to *Hevea brasiliensis*. When the company abandoned rubber for coconuts, Mr. Morse left the firm. In 1912 he made a tour of South America for the *India Rubber World*, and remained on its staff to become editor in 1917.

Mr. Morse retired as editor on July 8, 1935. He was a nine-year medal man of the Illinois National Guard, a member of the New York Rubber Association, and a former secretary-treasurer of the New York Rubber Group.

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### George F. Morrissey

George F. Morrissey, controller of the Habirshaw Cable and Wire Co., a division of the Phelps Dodge Copper Products Corp. in Yonkers, N. Y., died at his home in Yonkers on April 2. He was born in New York City 61 years ago.

### *Harry L. Boyer*

Harry Llewellyn Boyer, who was vice-president and general manager of the Joseph Stokes Rubber Co., Trenton, N. J., at the time of his retirement in 1928, died on March 17 at Santa Monica Hospital in Santa Monica, Calif. He was 75 years old. Mr. Boyer went to Trenton as a young man and became associated with the New Jersey Steel and Iron Co. In 1897, he joined the Joseph Stokes Rubber Co. (now Stokes Molded Products, Inc.), where he completed 31 years of active service. A few years after he retired, Mr. Boyer moved to Los Angeles, where he resided for over 20 years. Before his retirement, Mr. Boyer was a director of the First Mechanics National Bank, Wilbur Branch, Trenton. He was a member of Column Lodge 120, F. & A. M., Trenton Consistory, Ancient Accepted Scottish Rite 32nd Degree Masons and Crescent Temple. Mr. Boyer is survived by his widow. His only son, Howard Stokes Boyer, died in World War I service. Mr. Boyer was uncle to H. M. and E. L. Royal, of H. M. Royal, Inc., Trenton and Los Angeles, and to Joseph Stokes Royal, rubber sales agent in Chicago, Ill.

### *Hans V. Wodtke*

Hans V. Wodtke, 2nd vice-president and sales manager of the Narragansett Wire Co., Pawtucket, R. I., died on March 31 of a heart attack at his home in Attleboro, Mass. He was 71 years old. Born in Germany, Mr. Wodtke came to Akron, Ohio, from Michigan and worked in the Development Department of the old Diamond Rubber Co. Later he became associated with the B. F. Goodrich Co., where he helped develop the Insulated Wire Department. He had been associated with Narragansett Wire for the past few years. Funeral services were held on April 3 in Attleboro. His widow and two daughters survive.

### Mohawk Building New Factory

Mohawk Rubber Co., Akron, Ohio, has started work on a $500,000 factory near Denver, Colo., to manufacture tire recapping stock and repair materials. Production is scheduled to begin in late spring. Sufficient land is available at the new site to provide for further expansion. Mohawk said the new plant was prompted by increased demand for its products in the West and Southwest. High freight rates also figured in the decision to construct the factory, the first the company has established outside Akron. At the recent annual meeting of stockholders of the company, all officers and directors were re-elected.

### MBTS Available in Grain Form

The Rubber Chemicals Division of E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del., has announced the availability of MBTS (benzo thiazyl disulfide) in grain form. Thionex (tetramethyl-thiuram monosulfide) and Thiuram M (tetramethyl-thiuram disulfide) are also available from DuPont in the new granular form.

### Rubber Dust Fires

Sparks from foreign materials in the rubber covering of cylinders being ground to size caused a series of fires in a dust collector at a New England plant. Each fire was extinguished by the plant fire brigade with a large hose stream. Filter bags were destroyed in some fires while others occurred before filter bags could be replaced. Investigation disclosed that the rubber coverings contained coarse steel particles which produced sparks when ground. For the future, operators were instructed to set such pieces aside. Automatic sprinklers are advisable in dust-collectors having cloth bags; a dry-pipe or non-freeze system would be necessary. Wet-type collectors can sometimes be used to eliminate fires in dusts from grinding and buffing operations.—*Factory Mutual Record.*

### GP-233 Primary Plasticizer

GP-233, an odorless, dioctyl adipate available commercially as a primary plasticizer for vinyls and other synthetic resins, has been developed by the B. F. Goodrich Chemical Co., Cleveland 15, Ohio. Clear, and with exceptionally low acid content, GP-233 has been specifically designed to provide improved low temperature properties to vinyl and other synthetic resin compounds. GP-233 plasticized vinyl compounds will withstand temperatures as low as —70° F. without becoming brittle. The product may be used singly or may be blended with other plasticizers for use in all of the conventional molding techniques, including calendering, extrusion, and molding. GP-233 has a molecular weight of 370; specific gravity @ 25/15.5° C. of 0.925; boiling range @ 5 mm Hg is 98% between 210° C. to 218° C.; a refractive index of 1.4465; viscosity @ 25° C. of 18 centipoises, and volatility mg/cm³/hour @ 150° C. of 3.5.

### Four New Witco Black Plants

The Board of Directors of the Continental Carbon Company and Witco Chemical Company has announced its approval for immediate construction of four additional high abrasion furnace black units. These units will increase fourfold Continental's output of this new furnace black and the product will duplicate the HAF black now in production at Sunray, Texas.

### ORR Revises Distribution Circular

The Office of Rubber Reserve has revised its General Sales and Distribution Circular for Government Synthetic Rubbers. The revision, dated February 1, 1950, incorporates all the changes and amendments issued since the previous one. Copies of the circular may be secured on request from Office of Rubber Reserve, Reconstruction Finance Corp., 811 Vermont Ave., Washington 25, D. C.

### *Henry E. Perry*

Henry E. Perry, president of the Commercial Solvents Corp., New York, N. Y., died on March 15 in a fall from his fourteenth floor office in New York. He was 60 years old. Mr. Perry joined Commercial Solvents in 1922 as an engineer in its plant at Terre Haute, Ind. By 1934 he had become a vice-president and was elected a director five years later. In 1945 he was named executive vice-president and was elected president in 1947. He was also president and a director of the Thermatomic Carbon Co., and a director of the Interchemical Corp. and the Carrier Corp.

### *Frederick G. Schranz*

Frederick G. Schranz, consulting engineer and former vice-president of the Baldwin-Southwark Division of the Baldwin Locomotive Works, died on March 5 in the University of Pennsylvania Hospital, Philadelphia, Penna. Mr. Schranz, who was born in Vienna, was cited for his work in designing shell-forging equipment in both World Wars. He was president of F. G. Schranz, Inc., and at one time was general sales manager of the old Southwark Foundry and Machine Co. in Philadelphia. His wife and two daughters survive.

### *Henry Bacon Hubbard*

Henry Bacon Hubbard, former financial manager of sales for the U. S. Rubber Co., who retired in 1932 after 41 years in the rubber business, died on February 27 in Nassau Hospital in Mineola, L. I., N. Y. He was 79 years old. He was a Mason for 50 years. Funeral services were conducted on March 1 at the Protestant Episcopal Cathedral in Garden City, L. I., of which he was a vestryman. Interment was in Middletown, Conn., on March 2.

### Additional Barrett Bulletins

Four additional technical bulletins in its current series of technical reports on Barrett Rubber Compounding Materials were recently issued by the Barrett Division, Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y. Titles of these bulletins follow: BRS 700 Rubber Softener in a 50:50 GR-S-Natural Rubber Blend (Release No. 10); Carbonex 644 Rubber Compounding Hydrocarbon in Natural Rubber (Release No. 11); Cumar Resin, MH-2½ Grade, in Natural Rubber (Release No. 12); Barrett Rubber Softeners in Nitrile Rubber Compounding (Release No. 13).

### Stein, Hall Subsidiary Addition

Stein, Hall & Co., Inc., New York 17, N. Y., have awarded a contract for the construction of an addition to the plant of its subsidiary, Stein-Davies Co. in Long Island City, N. Y., for the manufacture of adhesives, textile and paper sizings, and industrial food products. The project involves a five-story and basement building, 90 by 100 feet, with laboratory facilities on the fifth floor. Work will commence immediately and the project is scheduled for completion next October.

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**An emulsion that glazes hot surfaces to give easy release from curing molds, and a high gloss finish on slabs.**

★ Instant, smooth release
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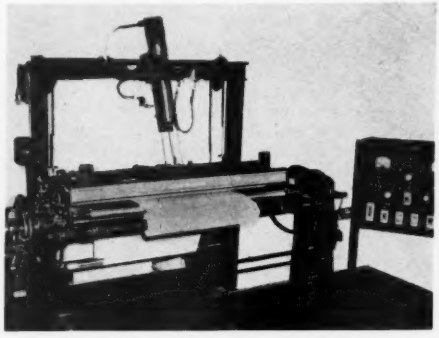
MERIT WESTERN CO.
1248 Wholesale St., Los Angeles 21, Cal.


# NEW EQUIPMENT

## Adamson Center Drive Wind-Up

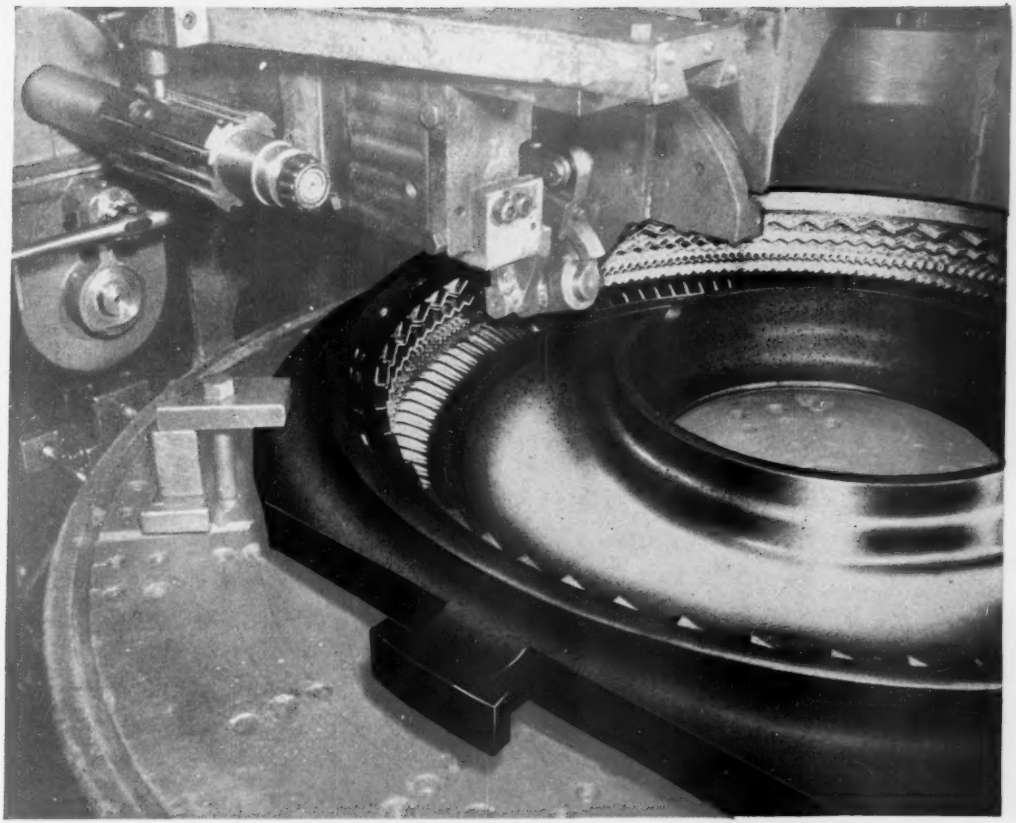
A new high speed, automatic, turret-type, center drive wind-up for thin plastic film has been developed by the Adamson United Co., Akron, Ohio. The machine is designed to receive a continuous film and wind it in selected lengths on paper cores. Cutting and transfer of the film from the full core to the empty core is instantaneous and completely automatic. The operator



is required only to remove the full roll from the machine and replace it with an empty core. Selection of length to be wound on each core is made by adjusting the dials of a yardage counter. The winder is of the center-driven, constant tension type, with total tension adjustable from one pound up. The unit is suitable for operating at speeds from 15 YPM to 150 YPM. The standard unit is arranged for film thickness up to .008-inch, and widths up to 60 inches, with total roll weight of 1000 pounds. Thicker and wider films can be handled by special modifications.

## Rotherm Revolving Joint

A new development in revolving joints for cooling and heating all types of rolls used in the rubber, paper and other industries has been announced by the Rotherm Engineering Co., Inc., 4911 West Irving Park Road, Chicago 41, Ill. The joint does not utilize bearings or flexible hose and requires no lubrication. With low turning torque, rotation takes place close to the roll minimizing roll misalignment. The joint itself is of the cartridge type, so that it is possible to change the cartridge quickly and easily. Rotation takes place between a ball and a seal that will take temperatures from —40° to +500°. Another ball screws into the piping and the cartridge assumes a position between the two balls correcting the roll to piping misalignment. The cartridge does not rotate and the joint can be used with a syphon pipe. A spring seated seal inside the cartridge holds the pressure, the higher the pressure the tighter the seal. The joint is designed for use on steam, air, oil, gas, water and other fluids.



# YOU NO LONGER PAY A HIGH PREMIUM FOR KNIFE BLADE MOLDS

As RECENTLY as six years ago the manufacture of knife blade molds was a troublesome and expensive process.

The cutting of innumerable slots to precision depth was slow and difficult. Insertion of knife blades was a patience-trying task for even the most skilled craftsman.

The machine shown above, designed and built by Bridgwater, saws slots in molds for knife blade inserts with a gauge as low as .015". It does it rapidly, with exact precision. The special saws used leave no burrs. Insertion of knife blades proceeds smoothly, quickly.

This development by Bridgwater has resulted in savings to tire manufacturers of up to 50% of the premium formerly paid for knife blade molds.

It is a typical example of our determination to design and build equipment of such a type that we are able to produce economically molds of whatever characteristics the tire industry requires.

ATHENS MACHINE DIVISION

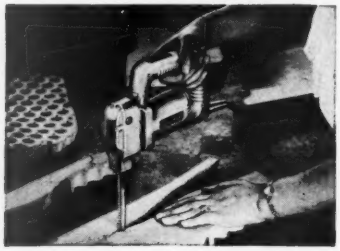
THE BRIDGWATER MACHINE COMPANY

*Akron, Ohio*

FOR BETTER MOLDS FOR BETTER TIRES *SPECIFY* BRIDGWATER

# *New* STANLEY *No. 99* SPONGE OR FOAM RUBBER CUTTER

**. . . cuts up to 4″ thick at speeds up to 30 ft. a minute!**



**A** brand new electric tool designed by Stanley that puts cutting of sponge and foam type rubber on a production basis. Saves time and material.

Follows any line or templet, inside or outside—straight cuts, curves and angles—with hairline precision. No concave edges, no torn or ragged work.

Light weight (only 4 lbs.). The duplex handle permits easy handling on all operations. Girl operators like it.

No. 99 Sponge Rubber Cutter operates on either A.C. or D.C. Blades are made of alloy steel for long life and are easily replaceable.

Save material, save time with the new Stanley Sponge Rubber Cutter No. 99. Ask your supply house, or write for folder. Stanley Electric Tools, 562 Myrtle St., New Britain, Conn.

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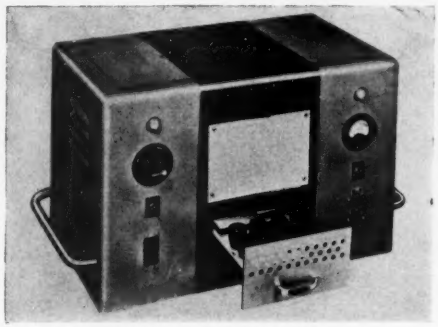
## High Frequency Pre-Form Heater

New advantages in rapid, uniform and thorough heating of rubbers, plastics and other dielectric materials characterize the pre-form heater announced by the High Frequency Heating Co., 143 Glen Park Ave., Gary, Ind. The new 1.5 AH Dielectric Heater is a bench machine, automatic, and built for dependable service



*This new dielectric heater can be used for pre-heating, drying, sealing and processing.*

in pre-heating, drying, sealing and processing. The heater will raise the temperature of 1⅓ pounds of average material 170 degrees in one minute. The loading tray is 6 inches by 8 inches and will accommodate material up to 3 inches high. Exceptionally high frequency energy is provided at 40 megacycles per second. Because of this high frequency a wider range of materials can be heated. The heater can handle alternate loads of different sizes to serve two presses. Size of the heater bench-mounted is 18 x 19 x 30 inches. Cooling is by double blower filtered air supply. The unit weighs 270 pounds.

*...stronger tubes...*


SEE PAGE 4

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2. Unlimited company owned and operated natural resources.
3. Three large New Mills (built post war) with the most modern equipment for producing water ground and air floated, classified calcium carbonate pigments.
4. A milling capacity large enough to fill all orders promptly—regardless of size.
5. A wide range of particle sizes from 200 mesh to minus 10 microns.
6. Mixed carloads at carload prices.

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OF ANY SIZE • ANY MATERIAL

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*Camachine* engineers have been providing the right answers to a great variety of roll-engineering questions for the rubber industries for more than fifty years. You are invited to write for specific information regarding any slitting and roll winding problem.

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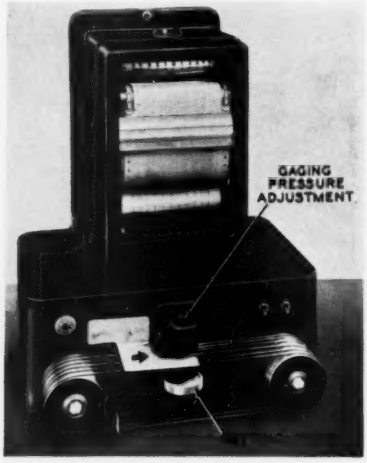
## Pratt & Whitney Micrograph

Designed and used to inspect a cross-section of continuous strip material such as cellophane, vinyl plastic and other materials, the Pratt & Whitney Micrograph, developed by Pratt & Whitney, Division of Niles-Bement-Pond Co., West Hartford 1, Conn., provides a new production control instrument for industry. After



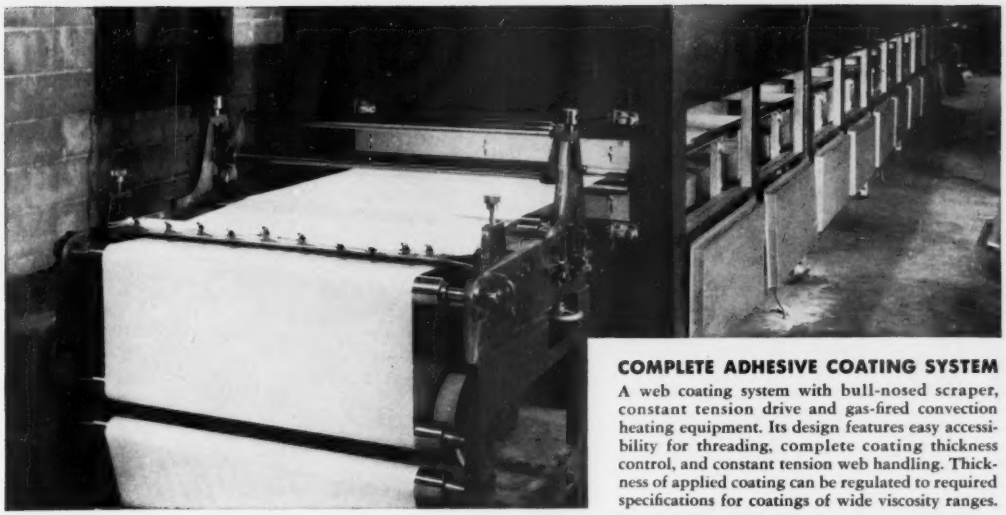

a 2-inch wide piece of the material to be gaged is cut out across the width of the strip material, the piece is placed lengthwise on the indexing feed mechanism of th micrograph which automatically indexes the material, takes a reading every ¼ inch and records the thickness. The indexing mechanism is tied into the chart drive of the recorder on a 1 to 1 ratio.

When a piece of material being gaged (which represents the width of the product in process) has passed through the micrograph, the length of the chart record is equivalent to the width of the material. The chart record can then be laid on the continuous strip material across the width of the line to afford a very accurate production control graph of the material thickness variations across the width. The P&W Micrograph is a comparator and it is set to a known thickness of material similar to the material to be inspected. The standard scale graduation is full scale ±.0005, each division representing .00002-inch, thus making it very adaptable for cellophane, thin plastic material or the like.

## Valv-Trol Hydraulic Operating Valves

Used to control the movement of hydraulic molding press rams or any hydraulically operated cylinder, Valv-Trol Hydraulic Operating Valves introduced by the Valv-Trol Co., 167 Hill St., Akron 8, Ohio, are operated by applying air pressure to the diaphragm top forcing the valve stem downward. The valve stem and the inner stem are returned to normal position by large diameter soft springs.

The Valv-Trol Two-Pressure Hydraulic Operating Valve, illustrated herewith, is an assembly of three inde-

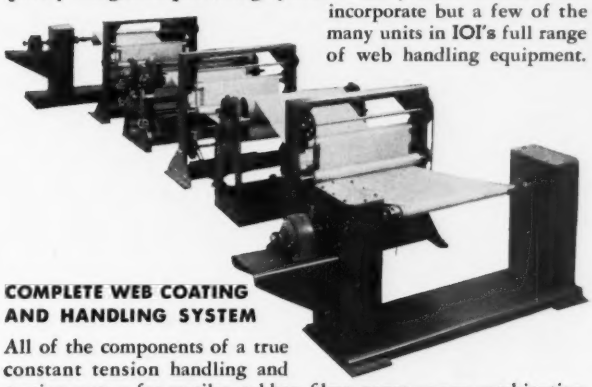


**COMPLETE ADHESIVE COATING SYSTEM**

A web coating system with bull-nosed scraper, constant tension drive and gas-fired convection heating equipment. Its design features easy accessibility for threading, complete coating thickness control, and constant tension web handling. Thickness of applied coating can be regulated to required specifications for coatings of wide viscosity ranges.

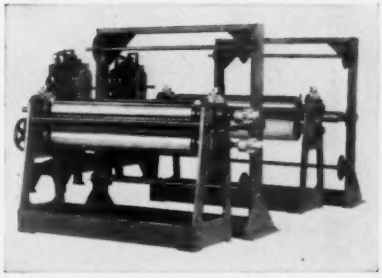
# 101 Coating and Processing Systems for
## TEXTILES...RUBBER...FILMS...PAPER

IN THE FIELD of coating and processing of web materials, textiles, rubber, films and paper, 101 has employed the principle of continuous operations with outstanding success, transforming various related but separately performed operations into completely integrated processing systems. The systems described here incorporate but a few of the many units in 101's full range of web handling equipment.



**COMPLETE WEB COATING AND HANDLING SYSTEM**

All of the components of a true constant tension handling and coating system for textiles, rubber, films, paper or any combination thereof, are shown in this photo with the evaporating oven omitted. This design features accurate tension control at the unwinding end, at the center, through the evaporating oven and at the final rewind stand. Tension ranges can be varied, as required, from light to heavy. Speeds can be accurately adjusted over a wide range.



**FILM ATTENUATING AND TENSIONING SYSTEM**

In the production of unsupported polyethylene sheeting, hot film tensions must be accurately maintained. As the formed film is produced this system propels it at medium to high speeds and attenuates it by means of variable speed drives and constant tension handling. Continuous operation, including continuous rewinding under constant tension, is a feature of the system.

*Write for 101 booklets, "Blueprint for Industry Part V, Coating and Handling Equipment for Textiles, Papers, Films, and Foils" and "The Handling of Webs and Monofilaments". An 101 engineer will be glad to call, on request, to discuss your specific production problems.*

**INDUSTRIAL 101 ENGINEERING VERSATILITY OVENS, INC.**

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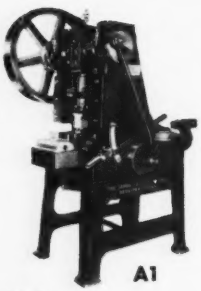
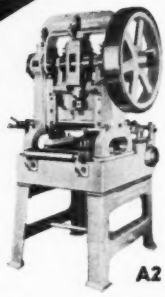


A1

# Men who Know PRODUCTION MACHINES Choose

the James COULTER Machine Co.
BRIDGEPORT, CONN.

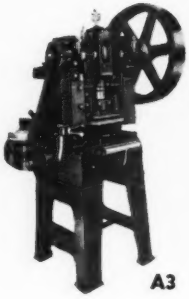
**MODEL A-1**
Cutting Heels at high speed production or short runs.



A2

**MODEL A-2**
Cutting Multiple Heels, Half and Full Soles with stock grain.

**MODEL A-3**
Cutting Multiple Heels and Taps with or across stock grain.



A3

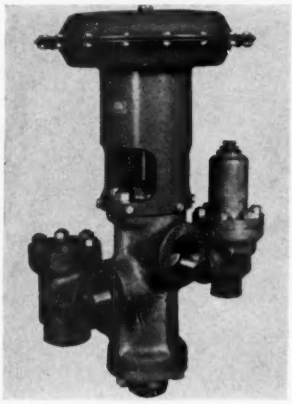
**MODEL A-2s**
(Not illustrated)
Cutting across grain of stock.

*COULTER PRODUCTION MACHINES SINCE 1896*



pendent valves each of which may be installed in the position most suitable for simplified piping; or the unit can be installed as an assembly. Low pressure is admitted to the main or three way valve, through the hydraulic angle check valve. High pressure is introduced either through the automatic inlet shown, or through a diaphragm controlled valve.

Valv-Trol valves stress all steel diaphragm tops, bodies of high grade bronze alloys, and all inner trim of acid



and corrosion resistant materials best suited to the service conditions. Discs and seats are heat treated to assure the maximum in wear and resistance to wire drawing. The skirted inner valve provides a gradual change in the rate of flow thereby eliminating shock. All foreign matter is flushed from the seats before final seal is completed. Interchangeability of parts between the various valves reduces the necessary inventory of spare parts to a minimum.

*...stronger tubes...*

SEE PAGE 4

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## Get the Answers with FEDERAL GAGES

BENCH-TYPE, MODEL 57-B1
Graduated .001", range 1.000", Throat depth 2 7/16".

PORTABLE, MODEL 22P
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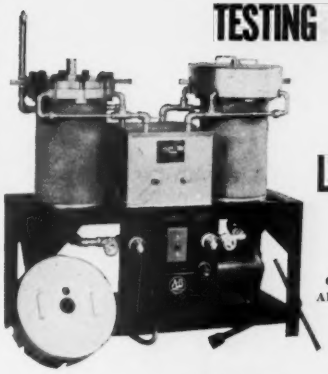
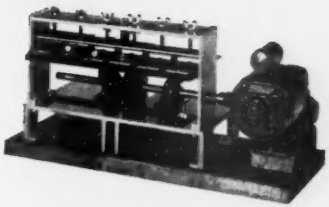
## TESTING APPARATUS for the RUBBER LABORATORY



COMBINATION BIERER-DAVIS OXYGEN AGING AND AIR HEAT TEST OUTFIT



ROSS FLEXING MACHINE WITH GEAR MOTOR

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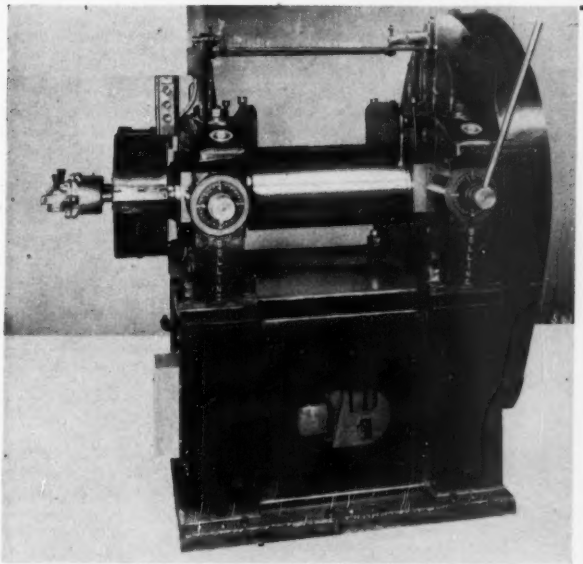

Illustration Frame #3. 12-12 x 24" (or 30") Mill on cabinet type base. Under-mounted motor.

## RUBBER MILLS

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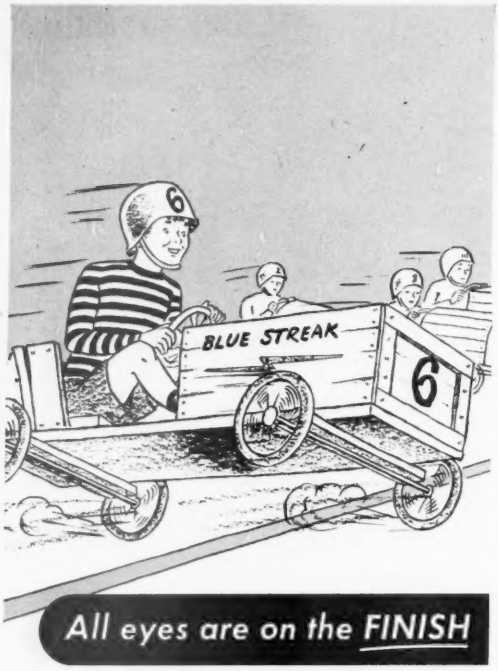


All eyes are on the FINISH

It was a close race, but there's no mistaking the *winner*. In the continual race for sales the manufacturer who is ahead in efficient, economical production methods is always the *winner*. By relying on the skill and ingenuity of STANLEY chemists to create just the right finishes, he cuts finishing costs, while increasing the durability and improving the appearance of his product.

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To help cut costs and build sales, STANLEY chemists specialize in "*special finishes for special applications*". Tell us your problem today; write to the STANLEY CHEMICAL CO., EAST BERLIN, CONNECTICUT.

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# REVIEWS

## BOOKS

**Elastomers and Plastomers: Vol. I. General Theory.** Edited by R. Houwink. Printed in the Netherlands. Available in the Western Hemisphere from the Elsevier Publishing Co., Inc., 215 Fourth Avenue, New York 3, N.Y. 6-¾ x 10 in. 496 pp. $7.00.

This is the first of three volumes in the Elsevier Polymer Series devoted to the chemistry, physics and technology of elastomers and plastomers. Due to a series of circumstances, Vol. I on general theory is the last of the three volumes to be issued. Vol. II was devoted to manufacture, properties and applications (RUBBER AGE, August, 1949, p. 580) and Vol. III to testing and analysis (RUBBER AGE, May, 1949, p. 228).

Like the other two volume in the series, this first volume on general theory contains contributions made by leading authorities in the field of elastomers and plastomers. It contains 10 separate chapters, each with an extensive bibliography, all tied together with a carefully cross-referenced subject index. There is, of course, considerable reference to rubber in practically each chapter. Titles and authors of the chapters follow:

(1) Economic Aspects, by H. A. Frank; (2) Organic Chemistry, by C. Koningsberger; (3) Reaction Kinetics and Mechanism of Polyreactions, by H. Wechsler, W. P. Hohenstein, and H. Mark; (4) Molecular Constitution, by G. J. van Amerongen; (5) Mechanical Properties, by G. J. van Amerongen; (6) Physics and Structure, G. J. van Amerongen; (7) Electrophysics, by L. Hartshorn; (8) Mechanical Operations, by H. Gibello; (9) Polymer Liquid Interaction, by G. J. van Amerongen; (10) Plasticizers, by R. S. Colborne.

•

**Annuaire du Caoutchouc: 1948-49. (Rubber Annual: 1948-49).** Edited by Jean Darroux. Published by Syndicat du Caoutchouc et des Industries qui s'y Rattachent, 9 Avenue Hoche, Paris-8e, France. 6 x 8½ in. 200 pp.

Somewhat similar in compilation to the RUBBER RED BOOK, this year book of the French Rubber Syndicate contains a good deal of data on the rubber manufacturing industry in France. It includes an alphabetical list of members of the Syndicate, with office and factory addresses, year of establishment, telephone number, telegraphic code, and principal products manufactured indicated for each company. In addition, it contains sections devoted to various types of rubber products, with suppliers indicated in each case, and to the various trade-marks used by members of the association. There is also a section listing importers of natural rubber, latex, balata, gutta-percha, etc., and another listing the suppliers of rubber chemicals and compounding ingredients. The latter section is divided into several general classifications, such as carbon black, colors, pigments, chemicals, textiles, etc. A brief history of the association, initially founded in 1863, is also included.

•

**Symposium on Insulating Oils.** Published by the American Society for Testing Materials, 1916 Race St., Philadelphia 3, Penna. In Two Sections. $1.35.

Under the auspices of A.S.T.M. Committee D-9 on Electrical Insulating Materials, three series of technical papers have been presented on insulating oils. These three series of papers have now been published, two of them as a reprint from the *ASTM Bulletin* and the third in special pamphlet form. Topics covered in the series include the following: Steam-Emulsion Number as an Index of Transformer Oil Serviceability; Interfacial Tension Test and Its Significance in Appraising Performance of an Insulating Oil; Advantages of an Inhibited Transformer Oil; Power Factor of Insulating Oils; Performance Characteristics of the Askarels; Performance of Inhibited Transformer Oils. In all, eleven papers are reproduced in the series.

**Industrial Chemistry. (5th Edition).** By E. Raymond Riegel. Published by the Reinhold Publishing Corp., 330 West 42nd St., New York, N.Y. 6 x 9 in. 1,015 pp. $7.00.

In the enormous task of revising this familiar text, the author has attempted to make this new edition a complete, informative, accurate and readable survey of the whole field of industrial chemistry. More than one thousand pages of text and illustrations cover the plants, equipment, machinery, materials and processes in over fifty chemical and process industries. The author's fundamental purpose has been to offer a picture of industry, process or installation, such as might be taken away after a personal visit in which all the operations from basic chemical reactions to finished products have been studied. To this nucleus there is added a broader description of each. The new edition has been largely rewritten, expanded and brought up-to-date. New material not represented in the previous editions includes antibiotics, the new organic insecticides and fungicides, the utilization of wood, novel methods of the application of dyes to fiber, atomic energy, and recent developments in plastics and petroleum. The 31-page chapter on rubber has been rewritten and brought up-to-date to conform with recent developments in the industry. In general, this text will prove an invaluable reference work for the engineer, technologist and specialist.

•

**La Journée du Latex.** (The Day of Latex). Published by Revue Générale du Caoutchouc, 42 Rue Scheffer, Paris-16e, France. 8¼ x 10¾ in. 56 pp. In French.

A one-day technical session devoted to the problems of latex users was held at the French Rubber Institute in Paris on July 5, 1944. Several brief papers on various latex aspects were presented at the session, edited versions of which appear in this booklet. Among these are the following: Production of Latex, by Jean de Lauzieres; Transport and Sale of Latex, by Maurice Favier; Dipping Thin Articles, by R. Acquerin; Manufacture of Gas Masks by the Kaysam Process, by Pierre Lemercier; Manufacture of Molded Toys from Latex (Kaysam Process), by Claude Delacoste; Molded Articles from Latex by the Chassaing Method, by Francois Chassaing; Latex Boots, by Paul H. Mensier; Use of Latex in the Manufacture of Tubing, by Jean Duval; Manufacture and Properties of Dunlopillo, by Raoul Lecomte; Use of Latex in Roads and Streets, by Robert Thiollet; Use of Latex in the Paper Industry, by Albert Beke; Electrophoresis of Rubber Latex, by Georges Genin; Applications of High Frequency Vulcanization in the Latex Industry, by Henri Leduc; Drying of Latex by Infrared Radiation, by Maurice Deribere.

•

**Scientific and Technical Abbreviations, Signs and Symbols. (2nd Edition).** By O. T. Zimmerman and Irvine Lavine. Published by Industrial Research Service, Dover, New Hampshire. 5¾ x 8½ in. 540 pp. $9.00.

Although the first edition of this volume appeared only last year, important developments in the field of abbrevations, signs and symbols have taken place within this relatively short period of time necessitating the issuance of a new and revised work. Among the major developments were issuance of new American standards for physics, electrical quantities, and aeronautics and aerodynamics; important revisions of several earlier American Standards; the adoption by the U. S. Weather Bureau of the International Weather Code, and the availability of new material pertaining to military abbreviations. All this new material, and more, has been incorporated into this second edition. Finally, corrections and changes have been made throughout the book. This work makes available in one convenient volume the principal abbreviations, signs, and symbols used in a number of scientific and technical fields. It also serves to encourage greater uniformity in the use of these abbreviations, signs, and symbols.

**POWDERED CELLULOSE**

*Light in weight*
*Easily dispersed*
*Uniform*
*White*

**CONTRIBUTES**

*Controlled stiffness and hardness*
*Smoother surfaces*
*Reduced shrinkage*
*Low gravity*
*Economy*

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## BOOKLETS, CATALOGS, etc.

**The Determination of Nitrogen in Crude Rubber.** (Communication No. 64). By G. J. van der Bie. Netherland-Indies Rubber Research Institute, Buitenzorg, Java, N.E.I. 6¼ x 9¼ in. 8 pp. In English.

There are several known methods for determining small amounts of nitrogen in crude rubber, including the Kjeldahl and Dumas methods. There is some question as to the reliability of the Kjeldahl method since higher values have been secured with the Dumas method, although it has been determined that this phenomenon is caused by impurities of methane in the nitrogen gas (which can be prevented by the use of lead chromate). Because of this situation, however, an investigation was launched to compare the figures obtained by analyses of a certain sample of rubber by means of various modifications of the Kjeldahl method with the hydrogenating method developed by Ter Meulen. The results of the investigation, which indicated that both methods are reliable, are reported in this bulletin.

•

**Compounding Rubber with Petroleum Products.** (G. B. Report No. 4). Chemicals Division, Golden Bear Oil Co., P.O. Box 846, Oildale, Calif. 6¼ x 9¼ in. 32 pp.

This booklet, a reprint of an article by Fritz S. Rostler and Heinz W. Sternberg from the March, 1949, issue of *Industrial and Engineering Chemistry*, reports a method of correlating chemical characteristics of petroleum products with their behavior as compounding ingredients. The approach, based on a quantitative chemical analysis and identification of groups of components, is fundamentally new in that compounding ingredients from petroleum are presented as chemicals rather than as proprietary products defined by trade names and functional terms only. The method outlined is reported to be generally applicable to all petroleum products and bitumens of high boiling range.

•

**Silvacon for the Rubber Industry.** (Bulletin No. 150). Silvacon Sales Div., Weyerhaeuser Timber Co., Longview, Washington. 8½ x 11 in. 4 pp.

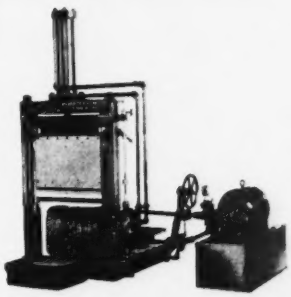
This bulletin describes the application of fractionated bark products in rubber compounds. It lists the principal uses and advantages of various fractions, and tabulates the physical and chemical properties of Silvacon fibers and powders. According to the bulletin, Silvacon increases flex life and tear strength, improves abrasion resistance, impact strength, dimensional stability, and finish, lowers compression set, and diminishes odors.

SEE PAGE 4

# TOUGH

## CUTTING JOBS MADE EASIER

It's advantages like these that make the "Black Rock" 4-KBW HYDRAULIC CRUDE RUBBER CUTTER the machine to use for cutting baled crude rubber, wax, scrap tires, scrap friction stock, rag rope and all materials which can not be cut by ordinary means.



- Fast—efficient—self contained.
- No lubricants needed for cutting.
- Automatic blade return.
- Cutting cycle 9 seconds (Max. stroke).
- Knife opening 30" x 20".
- Size 42½ x 83.
- Height 97".

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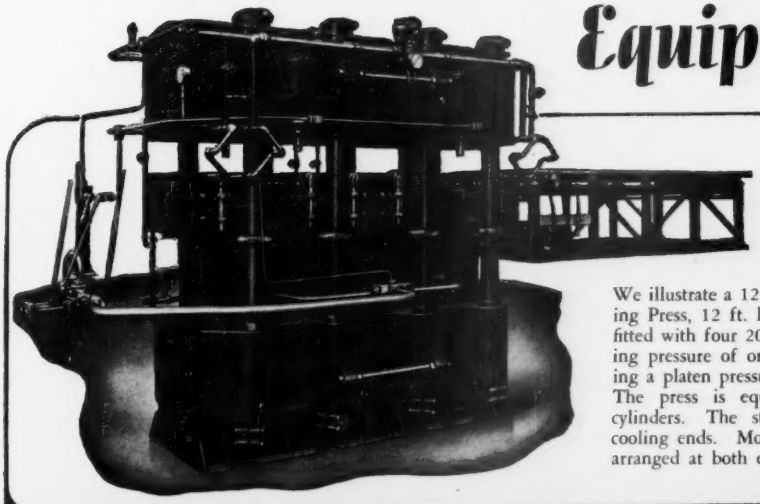
BROCKTON CUTTING DIE & MACHINE CO. INC.
CUTTING AND PERFORATING DIES

**AVON, MASS.**

# Hydraulic Vulcanizing Equipment



We illustrate a 1250 ton single daylight Sheeting Press, 12 ft. long by 3 ft. 6 inches wide, fitted with four 20" rams, suitable for a working pressure of one ton per square inch, giving a platen pressure of 450 lbs. per sq. inch. The press is equipped with four opening cylinders. The steel steam chests have 9" cooling ends. Motor driven drawtable can be arranged at both ends of the press if desired.

**FRANCIS SHAW & CO. LTD. MANCHESTER II ENGLAND**

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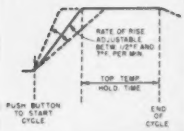
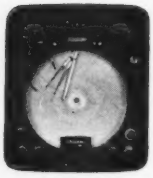
**BETTER . . .**
**Time-Schedule Control at the push of a button!**

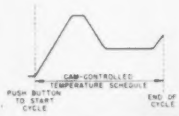



**On equipment like vulcanizers and platen presses,** you'll get precise time-schedule control like this, time after time . . .



**With an M-40 Cyclelog Camless Controller**

**Desired control schedule is easily set in few seconds by convenient control knobs. Automatic control starts at push of button. Controls at desired rate of rise and holds at selected top temperature for any selected period of time. If desired, will also hold preset base temperature. Controlled rate of cooling optional. Push button repeats cycle exactly. No cams to cut, change, or adjust.**




**On Polymerizers and Reactors,** you can duplicate accurate time-schedule control like this, day after day . . .

**With an M-40 Cam-Set Controller**

**Complete schedule determined solely by shape of cam which may be cut with as many dips, curves and holding periods as desired.**
**Highest sustained accuracy, easiest accessibility, space-saving compactness and remarkable simplicity have established Model-40 as "the finest modern controller". Write for Bulletin 438. The Foxboro Company, 256 Neponset Ave., Foxboro, Mass., U. S. A.**

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## REVIEWS (CONT'D)

**Panaflex BN—In Vinyl Chloride and Copolymer Resins (Bulletin No. 20). In Acrylonitrile Rubber (Bulletin No. 21).** Pan American Chemicals Division, Pan American Refining Corp., 122 East 42nd St., New York 17, N.Y. 8½ x 11 in. each.

As indicated by their titles, these technical bulletins cover the use of Panaflex BN, a high boiling synthetic hydrocarbon oil, in vinyl chloride and copolymer resins and in acrylonitrile rubber, respectively. In each case the physical properties of the plasticizer are given. In the first bulletin evaluations are shown of Panaflex BN-1 as a co-plasticizer with dioctyl phthalate in polyvinyl chloride resins and in Vinylite VYNW. Data is also shown on the electrical resistivity of polyvinyl chloride resin plasticized with dioctyl phthalate and Panaflex BN-1. The second bulletin contains evaluations of the plasticizer in Hycar OR-15, Hycar OR-25, and Paracril 26. The comparison of tack imparted by Panaflex BN-1 and dibutyl phthalate in Hycar OR-15 is also shown, as are the extrusion characteristics of Paracril 26 plasticized stocks.

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**Rubber as a Stress-Carrying Material and Some Design Considerations.** By S. W. Marsh. Published by Andre Rubber Co., Ltd., Kingston By-Pass, Surbiton, Surrey, England. 6 x 8½ in. 20 pp.

This is a booklet reproduction of a paper presented by the author before the Institution of Mechanical Engineers at London in November, 1948, and at other centers of that organization. The paper gives some indication of the mechanical properties of rubber, its behavior under stress, and some of its shortcomings. Various methods of bonding rubber to metal are discussed and reference is made to attempts on the part of rubber manufacturers to standardize on specific qualities in their compounds for specific applications. The booklet supplements the various papers and data issued by the company under the title of "Developments in Rubber."

•

**Convert to Comfort with Latex Foam.** Natural Rubber Bureau, 1631 K Street, N. W., Washington 6, D. C. 6 x 9 in. 20 pp.

Designed for the layman, this interesting booklet answers many basic questions peculiar to latex foam cushioning and its use. Not only does the booklet explain just what latex foam is, where it comes from, and the manner in which it is made, but it describes the different ways it can be used to provide comfort and beauty for the home and office. The booklet is illustrated with many cartoon and other drawings.

•

**Flex-O-Timer Time Cycle Controllers.** (Bulletin No. 98154). Taylor Instrument Companies, Rochester 1, N. Y. 8½ x 11 in. 16 pp.

A whole new family of controllers is described and illustrated in this bulletin. Photographs of complete instruments, sectional views and application drawings are used to illustrate the instruments. The bulletin outlines the manner in which the units control any particular group of functions which may be required in the sequence of a manufacturing operation, according to a predetermined schedule and over a specifically timed period.

•

**Cast Iron Pulleys for Industry. (Bulletin No. 33). Sprout, Waldron & Co., Inc., Muncy, Penna. 8½ x 11 in. 16 pp.**

The complete line of the company's "Blue-Face" pulleys is fully listed and described in this new bulletin. It contains specifications, extras, weights, data on how to order, etc. A supplementary bulletin, No. 35, furnishes user testimonials which indicate belt life increases from 15 to 400% through the use of Sprout-Waldron equipment.

# New Stock Cooling Rack

This new Rack gives unobstructed access to three sides of each tray and offers a convenient method for storing materials that require cooling or air drying. Trays are spring supported and can be quickly raised or lowered, free from all locking devices. Racks having 18 perforated trays 36" x 36" or plain surface trays 36" deep by 4 ft., 6 ft. and 8 ft. long, can be furnished either stationary or mounted on casters.

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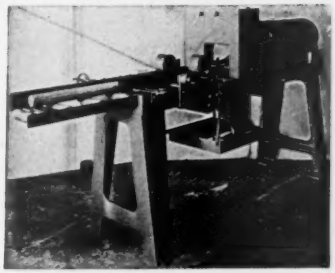

**With High Speed Disc Cutting Blade, Automatic Feed and with Tandem Feed Wheels. Capacity Section Up to 3" by 4½"—Length ⅛" to 4".**

**UTILITY MANUFACTURING COMPANY**
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# *Designed To Extrude RUBBER or PLASTICS*

IN these days of rapidly changing developments owners of Royle extruding machines are in the advantageous position of being able to adapt their extruders to either rubber or plastics production. If you are faced with the problem of extruding rubber and plastics the versatility of ROYLE extruders is of paramount importance to you. Whether you require a light or heavy production extruder features have been incorporated to assure maximum results. The change-over is quickly and simply accomplished.

Send for your copy of Bulletin No. 448. It describes these features and how they may be applied to older type extruders.

ROYLE # 2 Extruding Machine. Non-extended cylinder, plain tubing head.

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**PATERSON 3, NEW JERSEY**

# MARKETS

***Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings***

***NEW YORK, APRIL 6, 1950***

## Natural Rubber

A startling advance has marked the price of spot rubber on the Commodity Exchange since our last report (March 8). The high for the period was 24.25 cents reached today (April 6), representing a rise of 4.87 cents from the low of the period, 19.38 cents, reached on March 14. The average price of spot rubber for the month of March was 19.86 cents based on 23 trading days. In the previous month the average price of spot rubber was 19.40 cents.

In Singapore and London prices reached 20 and 25-year highs during the period. Trade circles differed on the causes for the price rises. Some predicted a prolonged shortage of natural rubber while others said the upswing would be short-lived.

Several developments combined to drive prices up. These included strikes of rubber workers in Java and Sumatra, civil disturbances in Malaya, and last-minute buying efforts of Far-Eastern rubber merchants who, oversold on April and May deliveries, have been seeking to cover on the very tight Singapore market.

The crux of the entire shortage of rubber lies in Indonesia, according to industry leaders. Indonesia, which has a potential production of 800,000 long tons, last year produced only 407,000 tons. In addition, since the first of the year, Indonesian shipments have been extremely small.

Today's quotations on the outside market, London and Singapore, follow:

### Outside Market

| | |
|---|---|
| No. 1 Ribbed Smoked Sheets: | |
| Spot | .23½ |
| April | .23¼ |
| May | .23 |
| Thin Latex Crepe: | |
| Spot | .24½ |
| April | .24½ |
| Thin Brown Crepe, No. 2 | .20⅞ |
| Ambers, No. 3 | .21 |
| Flat Bark Crepe | .19½ |

### London Market
*(Standard Smoked Sheets)*

| | |
|---|---|
| May | 22.02 - 22.17 |
| June | 21.73 - 21.88 |

### Singapore Market
*(Standard Smoked Sheets)*

| | |
|---|---|
| May | 21.19 - 21.23 |

## Synthetic Rubber
*(Dry Types-Per Pound)*

| | |
|---|---|
| Butaprene NF | .440 - .450 |
| Butaprene NL | .450 - .460 |
| Butaprene NAA | .490 - .500 |
| Butaprene NXM | .520 - 530 |
| Chemigum 30 N4NS | .400 - .470 |
| Chemigum 50N4NS | .400 - .470 |
| Chemigum N3 | .450 - .520 |
| GR-I | —— - .185 |
| GR-S | —— - .185 |
| Hycar OR-25 | .450 - .460 |
| Hycar OR-15 | .520 - .530 |
| Hycar OS-10 | .500 - .510 |
| Neoprene Types CG and AC | —— - .500 |
| Neoprene Type E | —— - .650 |
| Neoprene Types FR and KNR | —— - .750 |
| Neoprene Type GN | —— - .320 |
| Neoprene Type GN-A | —— - .320 |
| Neoprene Type RT | —— - .350 |
| Neoprene Type S | —— - .320 |
| Neoprene Type W | —— - .350 |
| Paracril 18 | .430 - .450 |
| Paracril 26 | .440 - .460 |
| Paracril 35 | .510 - .530 |
| Silastic (compounded) | 2.35 - 4.40 |
| Thiokol Type A | .370 - .470 |
| Thiokol Type FA | .520 - .620 |
| Thiokol PR-1 | .750 - .850 |
| Thiokol Type ST | .750 - .850 |

## Scrap Rubber

Moderate trading in scrap rubber has been reported with scrap tubes in fairly steady demand. Scrap rubber export was said to have shown a slight improvement, although still far from satisfactory. It was said that supplies graded for export shipment were bringing slightly higher prices than those quoted domestically. Minor price changes have been evidenced during this period. Current quotations follow:

| | | |
|---|---|---|
| **Mixed passenger tires** | ton | $13.00 |
| **Beadless truck tires** | ton | nom. |
| **Mixed truck tires** | ton | 15.00 |
| **Beadless passenger tires** | ton | nom. |
| **No. 1 passenger peelings** | ton | 42.50 |
| **No. 1 truck peelings** | ton | 42.50 |
| **Red passenger tubes** | lb. | .07 |
| Black passenger tubes | lb. | .03½ |
| **Mixed passenger tubes** | lb. | .04 |
| **No. 2 truck tubes** | lb. | nom. |
| **Red truck tubes** | lb. | .07 |
| **Black truck tubes** | lb. | .03½ |
| **Buffings** | ton | 15.00 |

## Reclaimed Rubber

Consumption of reclaim for the month of February is estimated at 19,824 long tons by the Department of Commerce. This compares with consumption of 20,106 tons in the previous month. Business in general continues at a brisk level with anticipation that there will not be any let-up in demand. Current quotations follow:

***Tires***

| | | |
|---|---|---|
| **Black, Digester (Natural)** | lb. | .08¼ - .08¾ |
| **Peels No. 1** | lb. | .08¼ - .08¾ |
| **Whole Tire (Blend)** | lb. | .08¼ - .08¾ |

***Inner Tubes***

| | | |
|---|---|---|
| **Black (Natural)** | lb. | .11½ - .12 |
| **Red (Natural)** | lb. | .13½ - .14½ |
| Butyl | lb. | .08¼ - .08¾ |

***Shoe***

| | | |
|---|---|---|
| Unwashed (Natural) | lb. | .08¼ - .09¼ |

## Cotton Tire Fabrics

Inadequate supplies of synthetic fibers plus stepped-up tire production have combined to increase the demand for cotton tire fabrics. While this condition is viewed as temporary in some quarters, increased demand should continue for the next few months according to trade sources. Current quotations follow:

| | | |
|---|---|---|
| **Standard, Peeler, 12/4/2** | lb. | .68 |
| **Standard, Peeler, 14/4/2** | lb. | .70 |
| **Standard, Peeler, 16/4/3** | lb. | .7250 |
| **Extra Staple, Peeler, 12/4/2** | lb. | .8315 |
| **Extra Staple, Peeler, 14/4/2** | lb. | .8575 |
| **Extra Staple, Peeler, 16/4/3** | lb. | .8825 |

## Chafers

| | | |
|---|---|---|
| **14.4 oz. (per sq. yard)** | lb. | .67 |
| 9.25 oz. (per sq. yard) | lb. | .63 |
| 11.65 oz. (per sq. yard) | lb. | .60 |
| **8.9 oz. (per sq. yard)** | lb. | .6475 |

## Cotton

The price of middling uplands on the Cotton Exchange has moved in the rather narrow range of 55 points since our last report (March 8), high for the period being 33.08 cents reached today (April 6), and low being 32.53 cents reached on March 9. The average price of middling uplands for March was 32.65 cents based on 27 trading days. This compares with an average of 32.79 cents for the previous month.

According to the Economic Cooperation Administration, Marshall Plan countries participating in the European Recovery Program bought 5,700,000 bales of American cotton during the first two years of the program. This sum represents about one-fourth of the nation's output during the period. France, Germany, Italy and the United Kingdom have received 90% of the ECA-financed cotton.

The Department of Agriculture has received clearance from the White House for the allocation of an additional 1,200,000 acres for growing cotton under 1950 allotments. President Truman recently signed a bill which added the extra acreage to the 21,000,000 acres allotted for the current year. The additional acreage was allowed in order to ease the plight of certain farmers who faced particularly drastic cutbacks in total acreage.

In the week ended March 30, the Commodity Credit Corporation had made loans on only 4,137 bales of cotton, while 95,030 bales were withdrawn in the same period. This leaves a net of 2,392,704 bales, with total repossessions of 767,251 already recorded. At this time a year ago the net was 4,391,477 bales.

Quotations for middling uplands on the Exchange follow:

| | Mar. 8 | April 6 | | |
|---|---|---|---|---|
| | Close | High | Low | Close |
| May | 32.22 | 32.49 | 32.42 | 32.48 |
| July | 32.14 | 32.58 | 32.52 | 32.57 |
| Oct. | 29.96 | 30.71 | 30.66 | 30.66 |

## *Closing Rubber Prices on New York Commodity Exchange*

***(No. 1 R.S.S. Contract)***

FROM MARCH 9 TO APRIL 6

| Mar. | Spot | May | July | Sept. | Dec. | Sales |
|---|---|---|---|---|---|---|
| 9 | 19.62 | 19.30 | 18.98 | 18.80 | 18.40 | 69 |
| 10 | 19.62 | 19.20 | 18.80 | 18.65 | 18.25 | 11 |
| 11 | —— | —— | —— | —— | —— | —— |
| 12 | —— | —— | —— | —— | —— | —— |
| 13 | 19.50 | 19.10 | 18.70 | 18.58 | 18.15 | 17 |
| 14 | 19.38 | 19.05 | 18.73 | 18.58 | 18.15 | 49 |
| 15 | 19.50 | 19.30 | 18.95 | 18.75 | 18.35 | 100 |
| 16 | 19.50 | 19.68 | 19.25 | 18.98 | 18.60 | 123 |
| 17 | 20.00 | 19.62 | 18.95 | 18.85 | 18.45 | 85 |
| 18 | —— | —— | —— | —— | —— | —— |
| 19 | —— | —— | —— | —— | —— | —— |
| 20 | 20.00 | 19.60 | 18.95 | 18.65 | 18.45 | 16 |
| 21 | 20.00 | 19.75 | 19.10 | 18.62 | 18.45 | 46 |
| 22 | 20.00 | 19.60 | 18.85 | 18.50 | 18.20 | 138 |
| 23 | 19.88 | 19.58 | 18.80 | 18.50 | 18.25 | 15 |
| 24 | 20.12 | 19.80 | 18.95 | 18.70 | 18.30 | 9 |
| 25 | —— | —— | —— | —— | —— | —— |
| 26 | —— | —— | —— | —— | —— | —— |
| 27 | 20.12 | 20.14 | 19.30 | 18.90 | 18.50 | 63 |
| 28 | 20.38 | 20.14 | 19.30 | 18.90 | 18.50 | 174 |
| 29 | 20.38 | 20.15 | 19.30 | 18.95 | 18.50 | 32 |
| 30 | 20.38 | 19.50 | 19.10 | 18.65 | 18.50 | 92 |
| 31 | 20.50 | 20.75 | 19.70 | 19.25 | 18.75 | 50 |
| April | | | | | | |
| 1 | —— | —— | —— | —— | —— | —— |
| 2 | —— | —— | —— | —— | —— | —— |
| 3 | 20.75 | 21.00 | 19.90 | 19.40 | 18.75 | 60 |
| 4 | 21.00 | 21.70 | 20.60 | 19.80 | 19.00 | 150 |
| 5 | 22.00 | 23.70 | 22.50 | 21.60 | 20.50 | 236 |
| 6 | 24.25 | 22.80 | 21.55 | 20.40 | 19.20 | 85 |

# NEW LABORATORY MILL

6" x 12" with Anti-Friction Bearings

THE laboratory mill illustrated above was expressly designed as a precision mill for operation at high temperature (650° F).

A self contained lubrication system circulates oil through the roll journal bearings. The use of piston ring type oil seals eliminates oil leaks and the frequent replacement of rubber-based oil seals. Write for specification folder.

Capacity of mill: 2 to 3 pounds
Space required: 28" wide, 60" long.

- *West Coast Rep.:* H. M. Royal, Inc., 4814 Loma Vista Ave., Los Angeles, Cal.
- *Export Agent:* Steinhardter & Nordlinger, 105 Hudson St., N. Y.

**THROPP**

**WM. R. THROPP & SONS CO.** Trenton, N. J.

SIMPLEX
REG. TRADE MARK

# RUBBER STRIP CUTTER

PATENTED

**A PORTABLE machine capable of stripping slab rubber up to 1" thick at the rate of 20,000 feet in 8 hours. Any width desired.**

SPECIAL FEATURES

- Has micro-adjustment for accurate widths.
- Equipped with water tank which feeds water to the slotted knife and to the cut.
- Has repulsion induction motor which carries any overloads.
- Automatic sharpener device keeps knife keen and sharp.
- Has base with rollers and is very easy to handle.

Cuts within 1/64 inch to 1/100 inch tolerance depending on grades of rubber. Cuts a slab down to the last shaving. Cuts all grades of rubber including pure gum, sponge, etc. Cuts squarely—no rejects.

*Now in use by many leading Rubber Manufacturers & Jobbers*

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Largest Conveyor Belt Press in the World

35' by 9'—total pressure 7800 tons

**G. Siempelkamp & Co., Maschinenfabrik, Krefeld, (Germany)**

# CURRENT MARKET PRICES

## Of Rubber Chemicals and Compounding Ingredients

**APRIL 5, 1950**

Prices are, in general, f.o.b. works. Range of prices indicates grade or quantity variations.

Abbreviations: bbls., barrels; c.l., carlot; cyl., cylinder; dlvd., delivered; dms., drums; l.c.l., less than carlot; M.B., masterbatch; min., minimum; ref., refined; sap., saponified; sp., special; syn., synthetic; t.c., tank cars.

[a] East of Mississippi.

*For Export Only

—The arrangement of this section follows closely the Chemical Section of the 1949 RUBBER RED BOOK to which readers are referred to determine the classification of any material or brand name.

—Although suppliers of every material were contacted for price information, only those materials are listed for which quotations have been furnished us. The quotations are not guaranteed and prospective purchasers should contact suppliers for confirmation before placing orders. Suppliers are requested to send us regularly current prices on all of their materials used in the rubber industry.

### ACCELERATORS

| | | | | |
|---|---|---|---|---|
| A-1 (Thiocarbanilide) | lb. | .40 | - | .47 |
| A-32 | lb. | .59 | - | .69 |
| A-77 | lb. | .42 | - | .55 |
| A-100 | lb. | .42 | - | .55 |
| Accelerator No. 8 | lb. | — | - | .90 |
| Accelerator—49 | lb. | .44 | - | .45 |
| Accelerator—89 | lb. | — | - | 1.20 |
| Accelerator—122 | lb. | — | - | 1.30 |
| Accelerator—552 | lb. | — | - | 1.80 |
| Accelerator—808 | lb. | .59 | - | .61 |
| Accelerator—833 | lb. | 1.13 | - | 1.15 |
| Acro AC-165 | lb. | .37 | - | .39 |
| Altax | lb. | .35 | - | .37 |
| Ancab* | lb. | .27 | - | .29 |
| Ancatex* | lb. | .35 | - | .37 |
| Ancazide* ET | lb. | — | - | 1.00 |
| ME | lb. | — | - | 1.10 |
| Ancazate* BU (ET & ME) | lb. | — | - | 1.00 |
| Arazate | lb. | — | - | 2.16 |
| Beutene | lb. | .59 | - | .61 |
| Bismate | lb. | — | - | 3.00 |
| B-J.F | lb. | .27 | - | .29 |
| Butasan | lb. | — | - | 1.00 |
| Butazate | lb. | — | - | 1.00 |
| Butyl Eight | lb. | 1.00 | - | 1.25 |
| Captax | lb. | .27 | - | .29 |
| C-P-B | lb. | — | - | 1.95 |
| Cumate | lb. | — | - | 1.45 |
| Dibenzo G-M-F | lb. | — | - | 2.50 |
| Diorthotolyguanidine | lb. | .48 | - | .50 |
| Diphenylguanidine | lb. | .39 | - | .45 |
| El-Sixty | lb. | .41 | - | .48 |
| Ethasan | lb. | — | - | 1.00 |
| Ethazate | lb. | — | - | 1.00 |
| Ethyl Thiurad | lb. | — | - | 1.00 |
| Ethyl Tuex | lb. | — | - | 1.00 |
| Ethylac | lb. | .88 | - | .90 |
| G-M-F | lb. | — | - | 2.50 |
| Good-rite Erie | lb. | .32 | - | .34 |
| Guantal | lb. | .47 | - | .54 |
| Harvex | lb. | .52 | - | .57 |
| Hepteen | lb. | .42 | - | .44 |
| Base | lb. | 1.80 | - | 1.85 |
| Ledate | lb. | — | - | 1.00 |
| Mercaptobenzothiazole | lb. | .29 | - | .32 |
| Mercaptobenzothiazyl Disulfide | lb. | .37 | - | .40 |
| Mertax | lb. | .40 | - | .47 |
| Methasan | lb. | — | - | 1.00 |
| Methazate | lb. | — | - | 1.00 |
| Monex | lb. | — | - | 1.10 |
| Mono Thiurad | lb. | — | - | 1.10 |
| Morfex | lb. | .56 | - | .58 |
| 2-MT | lb. | — | - | .62 |
| NA-22 (for neoprene) | lb. | — | - | 1.50 |
| Novac | lb. | — | - | 1.40 |
| A-13 | lb. | .65 | - | .67 |
| O-X-A-F | lb. | .39 | - | .41 |
| Pentex | lb. | — | - | 1.00 |
| Flour | lb. | — | - | .20 |
| Permalux (for neoprene) | lb. | — | - | 1.85 |
| Phenex | lb. | .40 | - | .45 |
| Pipazate | lb. | — | - | 1.53 |
| Pip-Pip | lb. | — | - | 1.80 |
| R-2 Crystals | lb. | — | - | 1.75 |
| Rotax | lb. | .39 | - | .41 |
| RZ-50 | lb. | — | - | 1.00 |
| SA 52 | lb. | — | - | 1.10 |
| SA 57 | lb. | — | - | 1.00 |
| SA 62 | lb. | — | - | 1.00 |
| SA 66 | lb. | — | - | 1.45 |
| SA 67 | lb. | — | - | 1.00 |
| SA 77 | lb. | — | - | 1.00 |
| Safex | lb. | — | - | 1.15 |
| Santocure | lb. | .58 | - | .65 |
| Selazate | lb. | — | - | 1.45 |
| Selenac (Ethyl, Methyl) | lb. | — | - | 1.45 |
| Setsit-5 | lb. | .75 | - | 1.00 |
| SPDX-GH (tons) | lb. | .64 | - | .69 |
| GL | lb. | — | - | .95 |
| Tellurac | lb. | — | - | 1.45 |
| Tepidone | lb. | — | - | .55 |
| Tetrone | lb. | — | - | 1.25 |
| A | lb. | — | - | 1.85 |
| Thiofide | lb. | .38 | - | .45 |
| Thionex | lb. | — | - | 1.10 |
| Thiotax | lb. | .30 | - | .37 |
| Thiurad | lb. | — | - | 1.10 |
| Thiuram E | lb. | — | - | 1.00 |
| M | lb. | — | - | 1.10 |
| Trimene | lb. | .54 | - | .56 |
| Base | lb. | 1.03 | - | 1.06 |
| Tuads, Ethyl | lb. | — | - | 1.00 |
| Tuads, Methyl | lb. | — | - | 1.10 |
| Tuex | lb. | — | - | 1.10 |
| Ultex | lb. | 1.00 | - | 1.05 |
| Unads | lb. | — | - | 1.10 |
| Ureka C | | .63 | - | .70 |
| Ureka C | | .55 | - | .62 |
| Vitasan Crystals | lb. | .48 | - | .53 |
| Vulcanex | lb. | — | - | .53 |
| Z-B-X | lb. | — | - | 2.45 |
| Zenite | lb. | .37 | - | .40 |
| A | lb. | .45 | - | .48 |
| B | lb. | .45 | - | .47 |
| Zenite Special | lb. | .38 | - | .41 |
| Zetax (coated) | lb. | .33 | - | .35 |
| (uncoated) | lb. | .34 | - | .36 |
| Zimate, Butyl | lb. | — | - | 1.00 |
| Zimate, Ethyl | lb. | — | - | 1.00 |
| Zimate, Methyl | lb. | — | - | 1.00 |

### ACTIVATORS

| | | | | |
|---|---|---|---|---|
| Blue Lead, Sublimed (dlvd.) | lb. | .15¾ | - | .16¾ |
| Fish Oil, Hydrogenated, Fatty Acid | | | | |
| Hydrofol Acid (dlvd.) | lb. | .10½ | - | .14½ |
| Hyfac 430 (dlvd.) | lb. | .13½ | - | .14½ |
| Neo-Fat H.F.O. (dlvd.) | lb. | .14 | - | .15¼ |
| Stearex Beads (dlvd.) | lb. | .09½ | - | .10 |
| Lime, Hydrated | | | | |
| Arrowhead | ton | — | - | 19.50 |
| Sierra | ton | — | - | 19.50 |
| Litharge | | | | |
| Eagle (dlvd.) | lb. | — | - | .1325 |
| FSB (dlvd.) | lb. | — | - | .1325 |
| Magnesium Oxide, Heavy | | | | |
| General Magnesite 500 | lb. | .05 | - | .06½ |
| 600 | lb. | .06 | - | .08 |
| Michigan No. 15 | lb. | .0550 | - | .0600 |
| Permanente | lb. | .05 | - | .06½ |
| Magnesium Oxide, Light | | | | |
| Baker's (Neoprene Grade) | lb. | — | - | .31 |
| General Magnesite (Neoprene Grade) | lb. | — | - | .31 |
| General Magnesite No. 101 | lb. | — | - | .19 |
| General Magnesite Standard | lb. | — | - | .22 |
| K & M (Neoprene Grade) | lb. | — | - | .31 |
| Maglite "M" (l.c.l.) | lb. | — | - | .31 |
| Marine's (Neoprene Grade (l.c.l.) | lb. | — | - | .31 |
| Michigan No. 30 | lb. | — | - | .24 |
| No. 40 Extra Light | lb. | — | - | .31 |
| Witco Extra Light | lb. | .32 | - | .35 |

### ACTIVATORS (Cont'd)

| | | | | |
|---|---|---|---|---|
| Oleic Acid | | | | |
| Emersol 210 (dlvd.) | lb. | .11¾ | - | .14 |
| L.C.P. Red Oil | lb. | .11 | - | .14 |
| Red Oil (20-24 Saponified) (dlvd.) | lb. | .10¼ | - | .14½ |
| Palm Oil Fatty Acid (c.l.) | lb. | — | - | .11 |
| Potassium Oleate (drums) | lb. | — | - | .29¼ |
| Red Lead | | | | |
| Eagle | lb. | — | - | .1325 |
| No. 2 RM (dlvd.) | lb. | — | - | .1325 |
| Sodium Laurate (drums) | lb. | — | - | .19 |
| Sodium Oleate—Powder (drums) | lb. | — | - | .35 |
| Paste (drums) | lb. | — | - | .20 |
| Sodium Stearate—Powder (drums) | lb. | — | - | .35 |
| USP Grade (drums) | lb. | — | - | .37 |
| Stearic Acid, Single Pressed | | | | |
| Emersol 110 (dlvd.) | lb. | .13 | - | .14 |
| Stearex B (dlvd.) | lb. | .13 | - | .14 |
| Stearic Acid, Double Pressed | | | | |
| Alba (dlvd.) | lb. | .14 | - | .17¾ |
| S-2-A (dlvd.) | lb. | .14 | - | .15 |
| S-2-B (dlvd.) | lb. | .12½ | - | .13½ |
| Stearic Acid, Other | | | | |
| Neo-Fat 1-60 (dlvd.) | lb. | .12¾ | - | .13½ |
| Neo-Fat 1-65 (dlvd.) | lb. | .13 | - | .15¼ |
| Stearite | | 99 | - | .10 |
| White Lead Basic Carbonate | lb. | .14 | - | .15 |
| White Lead Basic Sulfate | lb. | .13¼ | - | .14¼ |
| Zinc Laurate (c.l.) | lb. | — | - | .29 |
| Laurex | lb. | .24 | - | .25 |
| Zinc Stearate | lb. | .34 | - | .36 |
| Aquazinc | lb. | .20 | - | .35 |

### Unclassified Activators

| | | | | |
|---|---|---|---|---|
| Actifat (dms.) | lb. | — | - | .18 |
| Acidex | lb. | .09 | - | .15 |
| Aero Ac 50 | lb. | .50 | - | .56 |
| Aktone | lb. | .20 | - | .21 |
| Barak | lb. | — | - | .60 |
| Curade | lb. | .57 | - | .59 |
| D-B-A | lb. | — | - | 1.95 |
| Delac J | lb. | .55 | - | .57 |
| Dibutylamine (dlvd.) | lb. | .49 | - | .52½ |
| MODX-B | lb. | .20 | - | .25 |
| NA-11 | lb. | — | - | .65 |
| Palmalene (drums) | lb. | — | - | .15 |
| Polyac | lb. | — | - | 1.60 |
| Ridacto (drums) | lb. | .22 | - | .24 |
| Snodotte (dlvd.) | lb. | .13½ | - | .14½ |
| SOAC (min. 10 dms.) | cwt. | — | - | 8.00 |
| SOAC-KL (min. 10 dms.) | cwt. | — | - | 8.00 |

### ANTI-COAGULANTS

| | | | | |
|---|---|---|---|---|
| Anhydrous Ammonia (l.c.l.) | lb. | .17 | - | .21 |
| Aqua Ammonia (dms.) | lb. | .031 | - | .035 |
| M.B.M. (l.c.l.) | lb. | — | - | .35 |

### ANTI-FOAMING AGENTS

| | | | | |
|---|---|---|---|---|
| Aero Anti Foam H | lb. | — | - | .12½ |
| Regular | lb. | — | - | .08½ |
| D.C. Antifoam A | lb. | 5.65 | - | 6.65 |

### ANTI-OXIDANTS

| | | | | |
|---|---|---|---|---|
| Agerite Alba | lb. | 2.20 | - | 2.30 |
| Gel | lb. | .58 | - | .60 |
| Hipar | lb. | .82 | - | .84 |
| H. P. | lb. | .61 | - | .63 |
| Powder | lb. | .46 | - | .48 |
| Resin | lb. | .63 | - | .65 |
| Resin D | lb. | .46 | - | .48 |
| Stalite | lb. | .46 | - | .48 |
| White | lb. | 1.40 | - | 1.50 |
| Akroflex C | lb. | .61 | - | .63 |
| Aminox | lb. | .46 | - | .48 |
| Antox | lb. | .46 | - | .48 |
| Aranox | lb. | — | - | 3.25 |
| Benzoquinone | lb. | 1.50 | - | 1.75 |
| Betanox Special | lb. | .68 | - | .70 |
| B-L-E | lb. | .46 | - | .48 |
| Carvacrol | lb. | — | - | .78 |
| Chlorcarvacrol | lb. | — | - | 2.45 |
| Deenax | lb. | .95 | - | 1.05 |
| Eugenol C-95% | lb. | — | - | 1.45 |
| Flectol H | lb. | .46 | - | .53 |
| Flexamine | lb. | .61 | - | .63 |
| Gallic Acid, Tech. | lb. | 1.10 | - | 1.23 |
| USP or NF | lb. | 1.27 | - | 1.40 |
| Hydroquinone | lb. | .90 | - | .90 |
| Monomethylparaminophenol Sulfate | lb. | 2.40 | - | 2.90 |
| Neozone Standard | lb. | — | - | .75 |
| A | lb. | .48 | - | .50 |
| C | lb. | — | - | .60 |
| D | lb. | .46 | - | .48 |

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**STAMFORD, CONN.**
Makers of Stamford "Factice" Vulcanized Oil Since 1900

### ANTI-OXIDANTS (Cont'd)

| | | | |
|---|---|---|---|
| Oxidex | lb. | —— | 3.60 |
| **Paranone** | **lb.** | **——** | **.75** |
| **PDA-10** | **lb.** | **.36** | **.38** |
| **PDA-20** | **lb.** | **.36** | **.38** |
| Permalux | lb. | —— | 1.85 |
| **Pyrogallic Acid, Resublimed USP Crystals** | **lb.** | **2.60** | **2.65** |
| | lb. | 2.10 | 2.15 |
| **Resorcin, Tech. (dlvd.)** | **lb.** | **——** | **.64** |
| **Santoflex B** | **lb.** | **.46** | **.53** |
| BX | lb. | .58 | .65 |
| 35 | lb. | .65 | .72 |
| **Santovar-A** | **lb.** | **1.30** | **1.37** |
| O | lb. | 1.10 | 1.17 |
| Santowhite Crystals | lb. | 1.65 | 1.72 |
| **Santowhite MK** | **lb.** | **1.40** | **1.52** |
| **S.C.R. (tons)** | | **.32** | **.34** |
| Stabilite | lb. | .46 | .48 |
| Alba | lb. | .69 | .74 |
| L | lb. | .48 | .50 |
| White | lb. | .46 | .48 |
| Stabilizer No. 1 | lb. | —— | 1.55 |
| Stabilizer No. 320 | lb. | —— | .75 |
| Sunolite | lb. | .20 | .23 |
| Tannic Acid, Tech. | lb. | .46 | .48 |
| Thermoflex | lb. | 1.61 | 1.63 |
| Thymol Eugenol | lb. | —— | 1.02 |
| U.S.P. | lb. | —— | 3.50 |
| V-G-B | lb. | .65 | .67 |
| Wing-Stay S | lb. | .45 | .50 |

### ANTI-SCORCHING AGENTS

| | | | |
|---|---|---|---|
| **Armeen HT** | **lb.** | **.46** | **.54** |
| **Benzoic Acid—Tech.** | **lb.** | **——** | **.43** |
| Good-rite Vultrol | lb. | .55 | .57 |
| Retarder PD | lb. | —— | .36 |
| **Retarder W** | **lb.** | **——** | **.43** |
| Sodium Acetate 60-62% Crystals | lb. | —— | .06 |

### ANTISEPTICS AND GERMICIDES

| | | | |
|---|---|---|---|
| **Arquad S** | **lb.** | **.24** | **.27** |
| Formaldehyde (barrels) | lb. | —— | .062 |
| **G-4 (bbls.)** | **lb.** | **.95** | **2.75** |
| **G-11** | **lb.** | **3.50** | **5.50** |
| Methyl Para Hydroxy Benzoate | lb. | —— | 2.10 |
| Nuodex 100 S.S. (dlvd.) | lb. | —— | 1.05 |
| Nuodex 100 W.D. (dlvd.) | lb. | —— | 1.20 |
| Nuodex Zinc 8% (dms.) (dlvd.) | lb. | —— | .2125 |
| Ortho Cresol (26°-27°) | lb. | —— | .18 |
| **Retarder D** | **lb.** | **.68** | **.76** |
| **Soligen Drier—Copper 8%** (drums) | lb. | —— | .22½ |
| Zinc 8% (dms.) | lb. | —— | .21¼ |
| Vancide | lb. | —— | .80 |

### ANTI-WEBBING AGENTS (for Latex)

| | | | |
|---|---|---|---|
| Webnix 33 | lb. | 1.75 | 2.00 |

### AROMATICS (DEODORANTS)

| | | | |
|---|---|---|---|
| Bouquet 149 | lb. | —— | 3.00 |
| Coumarin | lb. | —— | 2.75 |
| Curodex 19 | lb. | —— | 4.75 |
| 188 | lb. | —— | 5.75 |
| 198 | lb. | —— | 6.75 |
| D-6 Masking Perfume | lb. | —— | 1.35 |
| Deodorant 65 | lb. | —— | 1.00 |
| Deodorant L-37 | lb. | 2.00 | 2.40 |
| L-44 | lb. | 2.50 | 2.90 |
| N.L.T.X. | lb. | 1.85 | 2.15 |
| Deodorant Oil GD 3427 | lb. | 1.70 | 2.00 |
| 4440 | lb. | 3.00 | 3.50 |
| 5296 | lb. | .95 | 1.25 |
| **General Deodorant 18301** | **lb.** | **——** | **2.40** |
| Latex Perfume 5 | lb. | —— | 3.25 |
| 6 | lb. | —— | 7.50 |
| 9 | lb. | —— | .65 |
| **Naugaromes (dms.)** | **lb.** | **1.50** | **3.00** |
| Neutredor 31 | lb. | 2.00 | 2.50 |
| Neutroleum Delta | lb. | —— | 2.60 |
| Gamma | lb. | —— | 2.60 |
| **Parador A** | **lb.** | **1.75** | **2.25** |
| B | lb. | .70 | 1.00 |
| C | lb. | 2.75 | 3.25 |
| D | lb. | 1.50 | 2.00 |
| E | lb. | .25 | .55 |
| F | lb. | —— | .47 |
| I | lb. | —— | 2.00 |
| K | lb. | —— | .43 |
| GD 5280 | lb. | —— | 2.50 |
| GD 5348 | lb. | 1.90 | 3.25 |
| Perfume Oil Bouquet Vanilla M | lb. | 2.40 | 2.75 |
| Resodor 11 | lb. | 2.00 | 2.50 |
| 12 | lb. | 1.45 | 1.75 |
| Rodo No. 0 | lb. | 4.00 | 4.50 |
| No. 10 | lb. | 5.00 | 5.50 |
| **Rubbarome (dms.)** | **lb.** | **1.05** | **3.80** |
| Rubber Perfume 12 | lb. | —— | 2.85 |
| **Russian Leather 7** | **lb.** | **——** | **4.10** |
| Vanillin | lb. | 3.00 | 4.00 |

### BLOWING AGENTS

| | | | |
|---|---|---|---|
| Ammonium Bicarbonate (dlvd.) | lb. | .0725 | .1075 |
| **Blowing Agent CP-975** | **lb.** | **——** | **.35** |
| Sodium Bicarbonate, U.S.P. (c.l., bags) | cwt. | —— | 1.95 |
| **Sponge Paste** | **lb.** | **——** | **.20** |
| Unicel | lb. | —— | .75 |
| ND | lb. | —— | 1.50 |
| S | lb. | —— | .25 |
| Urea | lb. | .0425 | .0475 |

### BONDING AGENTS

| | | | |
|---|---|---|---|
| **Durez 12987** | **lb.** | **.48** | **.53** |
| Interlake Resin No. 4162 | lb. | —— | 1.50 |
| **MDI** | **lb.** | **7.00** | **7.75** |
| **50** | **lb.** | **3.50** | **4.00** |
| Pliobond 20 | gal. | 2.75 | 4.00 |
| 30 | gal. | 3.45 | 4.70 |
| **Reasite** | **gal.** | **6.75** | **7.25** |
| **Rex Compounds** | **gal.** | **1.30** | **2.85** |
| Ty-Ply Q (BN & S) | gal. | 6.75 | 8.00 |

### COAGULANTS

| | | | |
|---|---|---|---|
| Acetic Acid—56% (bbls.) | cwt. | 8.11 | 8.61 |
| Glacial—99½% (bbls.) | cwt. | 14.05 | 14.55 |
| **Calcium Nitrate, Tech.., Crystals** | **lb.** | **.12½** | **.15** |
| **Hydroxyacetic Acid—70% (dms.)** | | **——** | **.084** |
| **Zinc Nitrate, Tech.** | **lb.** | **——** | **.21½** |

### COLORING AGENTS

#### Black

| | | | |
|---|---|---|---|
| **Carbon Black—See *Reinforcing Agents*** | | | |
| Aquablak B (also M, R) | lb. | .0725 | .0875 |
| **Aquablak S** | **lb.** | **.08½** | **.09** |
| **Black Shield 4-35 (dms.)** | **lb.** | **——** | **.0825** |
| **Lampblack No. 10** | **lb.** | **.06** | **.09** |
| **Mapico Black Iron Oxide (50 lb. bags)** | **lb.** | **.1075** | **.1100** |
| **Raven Black Pure Iron Oxide** | **cwt.** | **10.75** | **11.00** |

#### Blue

| | | | |
|---|---|---|---|
| Blue GD, Dispersed | lb. | —— | 3.95 |
| Blue GD Paste | lb. | —— | 1.80 |
| **Blue YD, Dispersed** | **lb.** | **——** | **2.50** |
| Milori Blue 11840 (dlvd.) | lb. | —— | .42 |
| **Monastral Fast Blue CPL** | **lb.** | **——** | **1.54** |
| PCD, Dispersed | lb. | —— | 2.50 |
| Ramapo Blue | lb. | 3.40 | 3.45 |
| Rubber Blue X-1999 | lb. | —— | 1.15 |
| Stan-Tone Blue | lb. | 1.40 | 4.00 |
| Ultramarine | lb. | .14 | .30 |
| Vansul Blue M.B. | lb. | .80 | 2.30 |
| Victoria Blue BP-262-D | lb. | 2.25 | 2.30 |

#### Brown

| | | | |
|---|---|---|---|
| **Brown Iron Oxide** | **lb.** | **.1075** | **.12** |
| Mapico Brown (50 lb. bags) | lb. | —— | .1250 |

#### Green

| | | | |
|---|---|---|---|
| Filo Green D-700 (and D-705) | lb. | —— | .30 |
| Green Chromium Oxide, Pure | cwt. | 34.50 | 42.00 |
| Green Chromium Oxide, Pure, Hydrated | cwt. | 90.00 | 110.00 |
| Green FD, Dispersed | lb. | —— | 1.50 |
| Monastral Fast Green GSD. Dispersed | lb. | —— | 3.20 |
| **GSL** | **lb.** | **——** | **1.71** |
| Permansa Green CP-594 | lb. | —— | 1.35 |
| Pigment Green B | lb. | —— | 1.35 |
| GL-652D | lb. | .88 | .93 |
| Ramapo Green | lb. | —— | 4.00 |
| Rubber Green X-1292 | lb. | —— | 1.00 |
| Stan-Tone Green | lb. | 1.50 | 3.30 |
| Vansul Green M.B. | lb. | .90 | 2.25 |

#### Maroon

| | | | |
|---|---|---|---|
| Stan-Tone Maroon | lb. | 3.00 | 3.05 |
| Vansul Maroon M.B. | lb. | 1.05 | 2.80 |

#### Orange

| | | | |
|---|---|---|---|
| Molybdate Orange | lb. | —— | .40 |
| **Orange FD, Dispersed** | **lb.** | **——** | **2.75** |
| **Rubber Orange X-2065** | **lb.** | **——** | **2.60** |
| Stan-Tone Orange | lb. | 1.65 | 4.00 |
| Vansul Orange M.B. | lb. | 2.15 | 2.95 |

#### Red

| | | | |
|---|---|---|---|
| Antimony Trisulfide | lb. | .55 | .68 |
| **R. M. P. Sulfur Free** | **lb.** | **.63** | **.68** |
| R. M. P. No. 3 | lb. | .55 | .60 |
| Cadmium Red | lb. | .95 | 1.25 |
| **Cadmolith Red (bbls.)** | **lb.** | **1.20** | **1.45** |
| Graphic Red (dlvd.) | lb. | —— | .80 |
| Indian Red, American, Pure | cwt. | 11.50 | 11.75 |
| Doxco (English) | cwt. | 11.50 | 11.75 |
| Mapico Reds (50 lb. bags) | lb. | .1150 | .1175 |
| Oximony Iron Oxide | lb. | —— | .09 |
| Red Iron Oxide, Light | cwt. | 11.50 | 11.75 |
| Red PBD Dispersed | lb. | —— | 1.55 |
| 2BD, Dispersed | lb. | —— | 1.65 |
| **2BL** | **lb.** | **——** | **1.15** |
| PBL | lb. | —— | 1.50 |
| Rubanox Red CP-762 (dlvd.) | lb. | —— | 1.40 |
| Rubber Red CP-339 (dlvd.) | lb. | —— | 1.05 |
| Rubber Red RT-364 | lb. | —— | .75 |
| Rubber Red RT-425 | lb. | —— | .75 |
| Rubber Red X-1148 | lb. | —— | .80 |
| Rubbered | lb. | .1150 | .1175 |
| Solfast Red CP-663 (dlvd.) | lb. | —— | 1.80 |
| CP-787 (dlvd.) | lb. | —— | 1.30 |
| Stan-Tone Red | lb. | 1.10 | 3.05 |
| Sun Burnt Red | lb. | .1150 | .1175 |
| Vansul Red M.B. | lb. | .80 | 2.45 |
| Watchung Red | lb. | —— | 1.80 |

#### White—Lithopone

| | | | |
|---|---|---|---|
| Albalith | lb. | .06¼ | .06¾ |
| Astrolith | lb. | .06¼ | .06¾ |
| Cryptone No. 19 | lb. | .08¼ | .08½ |
| CB No. 21 | lb. | .08¼ | .08½ |
| Eagle | lb. | .06¼ | .06½ |
| Permalith | lb. | .06¼ | .06¾ |
| Ponolith | lb. | .06¼ | .06¾ |
| Sunolith | lb. | .06¼ | .06¾ |

#### White—Titanium Pigments

| | | | |
|---|---|---|---|
| **Rayox** | **lb.** | **.19¼** | **.23½** |
| Ti-Cal | lb. | .07¾ | .08¼ |
| Ti-Pure | lb. | .21½ | .23½ |
| Titanox A—all grades (dlvd.) | lb. | .19½ | .20½ |
| B-30 (dlvd.) | lb. | .07 | .07½ |
| C (dlvd.) | lb. | .06¾ | .07¼ |
| **RA—all grades (dlvd.)** | **lb.** | **.21½** | **.22½** |
| RC-HT (dlvd.) | lb. | .07½ | .08 |
| Unitane O-220 | lb. | .195 | .205 |
| OR-250 | lb. | .215 | .225 |
| Zopaque | lb. | .19½ | .20¼ |

#### White—Zinc Oxide (American Process)

| | | | |
|---|---|---|---|
| AZO-ZZZ 11 (and 22, 33, 44, 55) | lb. | .11 | .11¼ |
| Eagle | lb. | .11 | .11¼ |
| Horse Head Special | lb. | .11 | .11¼ |
| XX Red | lb. | .11 | .11¼ |
| XX-505 | lb. | .12½ | .12¾ |
| Protox 166 | lb. | .11 | .11¼ |
| St. Joe Black Label | lb. | .11 | .11¼ |
| Green Label | lb. | .11 | .11¼ |
| Red Label | lb. | .11 | .11¼ |

#### White—Zinc Oxide (Dispersed)

| | | | |
|---|---|---|---|
| Dispersed Zinc Oxide | lb. | —— | 13 |

#### White—Zinc Oxide (French Process)

| | | | |
|---|---|---|---|
| AZO-ZZZ 66 | lb. | .13¼ | .13½ |
| Eagle Green Seal | lb. | .12¾ | .13 |
| Eagle Red Seal | lb. | .12¼ | .12½ |
| Eagle White Seal | lb. | .13¼ | .13½ |
| Florence Green Seal | lb. | .12¾ | .13 |
| Red Seal | lb. | .12¼ | .12½ |
| White Seal | lb. | .13¼ | .13½ |
| Kadox 25 | lb. | .13¼ | .13½ |
| Kadox 15, 17 and 72 | lb. | .11 | .11¼ |
| U. S. P. 12 | lb. | .14¼ | .14½ |

#### White—Zinc Sulfide

| | | | |
|---|---|---|---|
| Cryptone ZS-800 | lb. | .13¼ | .13½ |

#### Yellow

| | | | |
|---|---|---|---|
| Anchor Brand Pure Iron Oxide | cwt. | 9.00 | 9.25 |
| **Cadmolith Yellow (bbls.)** | **lb.** | **——** | **.95** |
| Chrome Yellow | lb. | —— | .25 |
| Chrome Yellow 12310 | lb. | —— | .28 |
| **Ferrox** | **cwt.** | **7.50** | **8.50** |
| Mapico Yellow (50 lb. bags) | lb. | .0900 | .0925 |
| Rubber Yellow X-1940 | lb. | —— | 1.60 |
| Stan-Tone Yellow | lb. | 1.00 | 2.25 |
| Toluidine Yellow | lb. | —— | 1.70 |
| YL-556-D | lb. | —— | .82 |
| Oximony Iron Oxide | lb. | —— | .06¾ |
| **Vansul Yellow M.B.** | **lb.** | **.90** | **1.00** |
| Yellow GD, Dispersed | lb. | —— | 1.85 |
| **GL** | **lb.** | **——** | **1.35** |
| Zinc Yellow | lb. | —— | .21 |

### DESTABILIZING AGENTS (for Latex)

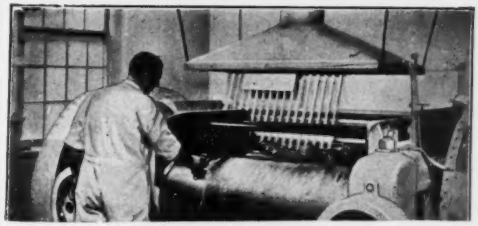
| | | | |
|---|---|---|---|
| D-Stayb | lb. | —— | 1.60 |

### DISPERSING AGENTS

| | | | |
|---|---|---|---|
| Agchem SA-19 | lb. | —— | .30 |
| SA-20 | lb. | —— | .70 |
| Anchoid* | lb. | .24 | .25 |
| **Aquasol AR 90%** | **lb.** | **——** | **.24¾** |
| **Armeen 18** | **lb.** | **.52** | **.60** |
| Beaconol 52 | lb. | .60 | .75 |
| Darvan No. 1 (and No. 2) | lb. | .21 | .30 |
| Daxad 11 (21, 23) | lb. | .08 | .35 |
| Dilex | lb. | —— | .32 |
| Dispersaid | lb. | 1.25 | 1.35 |
| Halloid | lb. | .03¾ | .09½ |
| HornKem No. 1 | gal. | —— | 1.60 |
| No. 3G | gal. | —— | 1.75 |
| No. 12 | lb. | —— | .17 |
| **Lomar PW** | **lb.** | **.16** | **.18** |
| Marasperse CB | lb. | .11½ | .13½ |
| N | lb. | .09 | .10 |
| Rubbex | lb. | —— | .27½ |
| **Stan-Chem BQC** | **lb.** | **.12¼** | **.17¼** |
| 1067 | lb. | —— | .13½ |
| 1471 | lb. | .1687 | .2187 |
| 2251 | lb. | .12¼ | .17¼ |
| **Trenamine D-25** | **lb.** | **.32½** | **.36** |
| D-100 | lb. | .48 | .51 |
| Triethanolamine (drums) (dlvd.) | lb. | .21½ | .22½ |
| Triton R-100 | lb. | .13½ | .24 |
| **Yelkin TT** | **lb.** | **——** | **.22** |
| **Zinsper** | **lb.** | **——** | **.15** |

### EXTENDERS

| | | | |
|---|---|---|---|
| Advagum 1098 | lb. | —— | .62 |
| **Bunaweld Polyaer No. 780** | **lb.** | **——** | **.22** |
| No. 5514 | lb. | —— | .30 |
| D-92 (and D-93) (dms.) | lb. | —— | .12 |
| Extender 600 | lb. | —— | .1480 |
| PR-162 Latex (dwrs.) | gal. | 1.00 | 1.60 |
| Synprolac | lb. | —— | .19 |
| Synprowax | lb. | .16 | .19 |
| Vistanex | lb. | —— | .32 |



## CHECK MILLWORK TEMPERATURE to prevent SCORCHED RUBBER

The scorching of rubber is a needless waste and is preventable. Make the use of Cambridge Pyrometers routine procedure for checking temperatures during calendering, mixing, extruding and molding. They are accurate, rugged, quick-acting instruments that take the guesswork out of temperature determination.

In addition to the Roll Model, Cambridge offers the Needle Model for checking temperatures within the mass, the Mold Model for reaching into mold cavities and multi-purpose Combination models.

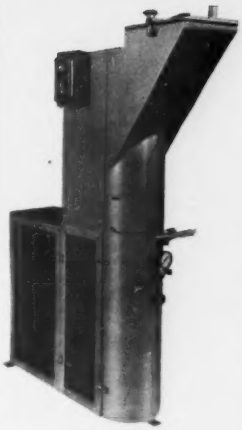
CAMBRIDGE INSTRUMENT CO., INC.
3754 Grand Central Terminal,
New York 17, N. Y.
Send for bulletin 194S

**CAMBRIDGE**

**Roll · Needle · Mold**

**PYROMETERS**

PIONEER MANUFACTURERS OF PRECISION INSTRUMENTS



*Campbell Model 1404-2*

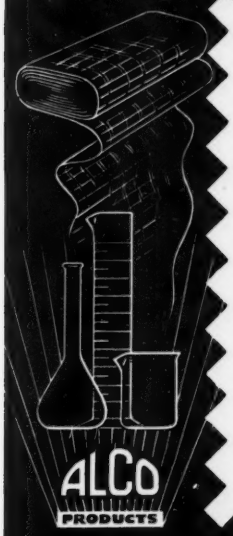
## MOISTURE SELLS RED INK!

When ordinary Dusters foul up the trouble is usually with moisture in factory air lines. That costs you money!

The Campbell Duster makes its own air. No factory air lines required. Precision control of output of soapstone or other materials. Handy outlet door for changing materials. Airtight, dust-proof chamber.

Recent improvements make the Campbell more and more a "must" for you. For trouble-free dusting operation, wire, phone or write us as soon as you read this advertisement.

The FALLS ENGINEERING AND MACHINE CO.
1734 FRONT ST. CUYAHOGA FALLS, OHIO
Established 1917




## AN IMPORTANT ANNOUNCEMENT

Alco Oil & Chemical Corporation is now in a position to supply you with

# VULCARITES

**COMPOUNDING DISPERSIONS OF RUBBER CHEMICALS**

**VULCARITES are supplied as individual dispersions of zinc oxide, sulfur, antioxidants and accelerators. Composite dispersions of these chemicals are also available.**

**Inquiries on special dispersions formulated to definite specifications are invited.**

★ ★ ★

Samples and technical service available promptly on request.

**ALCO OIL & CHEMICAL CORPORATION**
TRENTON AVE. and WILLIAM ST., PHILADELPHIA 34, PA.

SOUTHERN DISTRIBUTORS
WICA COMPANY INC.
CHARLOTTE, N.C.

## FILLERS (Inert and Reinforcing)

| | | | |
|---|---|---|---|
| **Abrasives** | | | |
| **Carbonite** | lb. | .15 | - .95 |
| **Lignite** | lb. | .09¼ | - .90 |
| **Pumice** | lb. | .03 | - .05 |
| **Aluminum Hydrate** | lb. | — | - .17 |
| **Aluminum Silicate** | | | |
| **Silical** | ton | 37.00 | - 55.00 |
| **Marter White** | ton | 18.50 | - 30.00 |
| **Barium Carbonate (l.c.l.)** | ton | 72.50 | - 90.00 |
| **Barytes** | | | |
| **No. 1 Floated, White** | ton | 34.85 | - 49.65 |
| No. 2 Floated, Unbleached | ton | — | - 32.85 |
| **No. 22 Barytes (c.l.)** | ton | — | - 18.37 |
| **Foam A** | ton | — | - 34.85 |
| **Bentonite (c.l.)** | ton | — | - 11.50 |
| **SPV Volclay (c.l.)** | ton | — | - 11.50 |
| **Blanc Fixe** | ton | 72.50 | -120.00 |
| **Calcium Carbonate** | | | |
| **Atomite (c.l.)** | ton | — | - 30.00 |
| **B.I. White No. 1 (c.l.)** | ton | — | - 7.50 |
| **B.I. White No. 2 (c.l.)** | ton | — | - 7.00 |
| **B.I. White No. 390 (c.l.)** | ton | — | - 5.75 |
| Blue-Star XX | ton | — | - 15.00 |
| **Calcene T** | ton | 45.00 | - 55.00 |
| Caltec | ton | 40.00 | - 67.50 |
| Calwhite | ton | — | - 17.00 |
| **Camelwite** | ton | — | - 30.00 |
| **Kalite (c.l.)** | ton | — | - 40.00 |
| **Lesamite (c.l.)** | ton | — | - 27.50 |
| **Lim-Cal (c.l.)** | ton | — | - 12.50 |
| Micromite | ton | — | - 30.00 |
| **Millical (c.l.)** | ton | — | - 27.50 |
| **Multifex** | ton | — | -105.00 |
| Non-Fer-Al | ton | — | - 20.00 |
| Purecal M | ton | 45.00 | - 52.50 |
| U | ton | 105.00 | -125.00 |
| **Sierracal** | ton | 15.00 | - 18.50 |
| **Super Multifex** | ton | — | -145.00 |
| Surfex (c.l.) | ton | — | - 30.00 |
| **Suspenso (c.l.)** | ton | — | - 22.00 |
| Witcarb R (c.l.) | ton | 105.00 | -120.00 |
| R-12 (c.l.) | ton | 45.00 | - 66.00 |
| **York White** | ton | — | - 9.00 |
| **Calcium Silicate** | | | |
| Silene EF | ton | 110.00 | -120.00 |
| **Calcium Sulfate, Anhydrous** | | | |
| Snow White Filler | ton | — | - 18.00 |
| **Calcium Sulfate, Hydrous** | | | |
| Crysta-Cal (c.l.) | ton | — | - 12.50 |
| Terra Alba No. 1 | ton | 12.00 | - 14.40 |
| **Chalk Whiting (l.c.l.)** | lb. | .0150 | - .0175 |
| **Recco Paris Whiting** | ton | — | - 28.00 |
| **Clay** | | | |
| **Alsilite (c.l.)** | ton | 14.00 | - 22.50 |
| **Alsite (c.l.)** | ton | — | - 14.00 |
| **Aluminum Flake** | ton | 16.50 | - 36.00 |
| **A.S.P. No. 1 (c.l.)** | ton | — | - 35.00 |
| No. 11 (c.l.) | ton | — | - 40.00 |
| Buca (c.l.) | ton | — | - 45.00 |
| Burgess No. 20 | ton | — | - 35.00 |
| No. 30 | ton | — | - 37.00 |
| **Burgess Iceberg** | ton | — | - 50.00 |
| Burgess Polyclay | ton | — | - 40.00 |
| Catalpo (c.l.) | ton | — | - 35.00 |
| **Champion** | ton | — | - 14.00 |
| **C.S.D. (c.l.)** | ton | — | - 13.00 |
| **Crown** | ton | — | - 14.00 |
| **Dixie (c.l.)** | ton | — | - 14.00 |
| Hi-White R | ton | — | - 13.50 |
| Hydratex R | ton | — | - 30.00 |
| **Kaoloid Clay (c.l.)** | ton | — | - 10.50 |
| Marham (c.l.) | ton | 14.00 | - 35.00 |
| **McNamee (c.l.)** | ton | — | - 13.50 |
| Oldham (c.l.) | ton | 13.50 | - 35.00 |
| Paragon | ton | — | - 13.50 |
| Pigment 33 | ton | — | - 37.00 |
| **Recco (c.l.)** | ton | — | - 14.00 |
| Stellar-R | ton | — | - 50.00 |
| Suprex | ton | — | - 14.00 |
| **Upton** | ton | 19.50 | - 21.50 |
| **Whitetex (c.l.)** | ton | — | - 50.00 |
| Witco No. 1 (c.l.) | ton | 14.00 | - 37.50 |
| No. 2 (c.l.) | ton | 14.00 | - 37.50 |
| **Diatomaceous Earth** | ton | 30.00 | - 50.00 |
| **Kaylorite (c.l.)** | ton | — | - 30.00 |
| Lorite | ton | — | - 30.00 |
| **Dolomite (c.l.)** | ton | 11.00 | - 12.00 |
| **Flock** | | | |
| **Cotton, white and colored** | lb. | .10 | - .20 |
| Fiffloc F 40-9000 | lb. | — | - .16 |
| Fiffloc F 6000 | lb. | — | - .22 |
| Polycel | ton | 145.00 | -178.00 |
| **Rayon, bleached or dyed** | lb. | .81 | - 1.50 |
| **Rayon, grey** | lb. | — | - .18 |
| **Rayon, pink** | lb. | — | - .14 |
| **Solka-Floc (c.l.)** | lb. | .05 | - .15 |
| **Wool, bleached or dyed** | lb. | .70 | - 1.00 |
| Glue, Bone (dlvd.) | lb. | .18 | - .20½ |
| **Graphite** | lb. | .05 | - .20 |
| **Ground Glass (l.c.l.)** | lb. | .04 | - .06 |
| **Leather, Shredded** | lb. | .05 | - .17 |
| **Lignin** | lb. | .03 | - .06 |
| Indulin | lb. | .09 | - .10 |
| **Limestone, Pulverized** | ton | 3.25 | - 10.00 |
| **Micro Velva** | ton | 45.00 | - 47.00 |
| **Velvet Filler, Regular** | ton | 20.00 | - 22.00 |
| **Magnesium Carbonate** | lb. | .09 | - .10 |
| **K & M Clearcarb** | lb. | .1175 | - .1225 |
| **Magnesium Oxide** | lb. | .05 | - .06 |
| **Magnesium Silicate** | ton | 18.00 | - 35.00 |
| Airex | ton | 25.00 | - 27.00 |
| **Asbestol** | ton | 20.00 | - 22.00 |
| Blue Star Talc | ton | — | - 23.00 |
| **L.S. Silver** | ton | 23.50 | - 25.50 |
| **Sierra White** | ton | 21.25 | - 23.25 |

## FILLERS (Cont'd)

| | | | |
|---|---|---|---|
| Mica | lb. | .01¼ | - .07¼ |
| **Concord** | lb. | .0675 | - .0750 |
| **Micro-Mica** | lb. | .06¾ | - .07½ |
| **Mineralite (c.l.)** | ton | 25.00 | - 40.00 |
| **Silversheen** | lb. | .06¾ | - .07½ |
| Triple A Mica (c.l.) | ton | — | - 25.00 |
| **Vermiculite** | lb. | .075 | - .085 |
| **Wet Ground Biotite Mica** | lb. | .05½ | - .06¼ |
| **Wet Ground Mica No. 160** | lb. | .06¾ | - .07½ |
| **Mineral Black** | | | |
| **Keystone 126** | ton | 15.00 | - 20.00 |
| **Pyrophyllite** | | | |
| Pyrax A (c.l.) | ton | — | - 12.50 |
| **WA (c.l.)** | ton | — | - 15.00 |
| **Silica** | ton | 16.00 | - 27.00 |
| **Blue Star** | ton | — | - 21.50 |
| Hi-Sil | ton | 220.00 | -240.00 |
| **Slate, Powdered (l.c.l.)** | ton | 15.00 | - 20.00 |
| **Talc, Domestic** | ton | 9.00 | - 20.00 |
| Nytal 200 | ton | 23.00 | - 40.00 |
| 300 | ton | 35.00 | - 52.00 |
| Walnut Shell Flour | ton | 40.00 | -100.00 |
| **Whiting, Commercial** | ton | — | - 12.00 |
| **Cameline (c.l.)** | ton | 8.50 | - 10.00 |
| **C-C-O White** | ton | — | - 17.00 |
| **Keystone (c.l.)** | ton | — | - 16.00 |
| **Rambo No. 1 White** | ton | — | - 6.50 |
| **No. 6 White** | ton | — | - 9.00 |
| **Snowflake (c.l.)** | ton | — | - 18.00 |
| **Veroc (c.l.)** | ton | — | - 6.50 |
| Welco (c.l.) | ton | — | - 7.50 |
| **York White R (c.l.)** | ton | — | - 8.00 |
| **Wood Flour** | ton | 20.00 | - 62.18 |

## FINISHING MATERIALS, SURFACE

| | | | |
|---|---|---|---|
| **Beaco Finishes** | gal. | 1.05 | - 1.35 |
| **Black Out** | gal. | 4.50 | - 8.00 |
| Shellac, Orange Gum | lb. | .45 | - .54 |
| **VanWax** | gal. | 1.25 | - 1.30 |

## FLAME RETARDANTS

| | | | |
|---|---|---|---|
| **Cellufiux** | lb. | .36½ | - .38½ |
| Chlorinated Paraffin 42 | lb. | — | - .12¼ |
| Halowax | lb. | .24 | - .39 |
| Zinc Borate 3167 | lb. | .15½ | - .16 |
| **Zyrox** | lb. | .65 | - .79 |

## LUBRICANTS, MOLD

| | | | |
|---|---|---|---|
| **Aquadag** | lb. | 3.15 | - 3.45 |
| Aquarex D | lb. | — | - .76 |
| L Paste | lb. | — | - .85 |
| ME | lb. | — | - .92 |
| MDL Paste | lb. | — | - .30 |
| WA Paste | lb. | — | - .25 |
| **Akro Gel** | lb. | — | - .165 |
| **Borax, Granular (l.c.l.)** | ton | 70.00 | - 80.00 |
| **Colite Concentrate (dms.)** | gal. | — | - .90 |
| **Concentrex** | lb. | — | - .25 |
| D.C. 7 Compound | lb. | 6.20 | - 6.80 |
| D.C. Emulsion No. 35 | lb. | 1.84 | - 3.50 |
| 35A | lb. | 1.84 | - 3.50 |
| D.C. Mold Release Fluid | lb. | 4.90 | - 6.00 |
| **Dipex** | lb. | .14 | - .18 |
| **Dri-Lube** | lb. | — | - .22 |
| **Erlen Mold Lubricant** | gal. | 1.25 | - 1.50 |
| **Glydag** | lb. | 1.30 | - 2.00 |
| Hawkeye Flake (dlvd.) | lb. | — | - .12 |
| **Kokobace** | lb. | — | - .12 |
| Latex-Lube (dlvd.) | lb. | — | - .18½ |
| Liqui-Lube (dlvd.) | lb. | — | - .14¾ |
| **Lubrex** | lb. | .25 | - .30 |
| **Migralube** | lb. | — | - .37 |
| **Moldeze No. 1** | gal. | — | - 36.00 |
| **No. 3** | gal. | — | - 7.50 |
| Mold Lubricant No. 72 | | | |
| Conc. | gal. | 2.50 | - 4.00 |
| **No. 735** | gal. | 1.26 | - 2.75 |
| No. 765 | gal. | 2.50 | - 4.00 |
| No. 767 | gal. | 1.52 | - 3.00 |
| No. 768 | gal. | 2.50 | - 4.00 |
| No. 769 | gal. | 1.20 | - 2.70 |
| **Mold-Slick** | lb. | .202 | - .215 |
| **Orvus WA Paste (dms.)** | lb. | — | - .25 |
| **Prodag** | lb. | .25 | - .38 |
| Purity Flake (dlvd.) | lb. | — | - .14 |
| Redotex Flakes (dlvd.) | lb. | .14¾ | - .15 |
| Powder (dlvd.) | lb. | .14⅞ | - .15½ |
| Rubber-Flo | gal. | 1.15 | - 1.50 |
| Rubber-Glo | gal. | — | - .94 |
| **Rusco Mold Paste** | lb. | — | - .25 |
| **Sericite (l.c.l.)** | ton | 65.00 | - 75.00 |
| **Thermalube** | lb. | — | - .11 |
| **Ulco Mold Soap** | lb. | .16 | - .29 |
| Werkrite Flakes (dlvd.) | lb. | .10⅞ | - .11½ |
| Powder (dlvd.) | lb. | .11⅝ | - .12¼ |

## LUBRICANTS, RUBBER

| | | | |
|---|---|---|---|
| Extrud-o-Lube | gal. | — | - 1.57 |
| G.B. Naphthenic Neutrals | gal. | .11 | - .18 |
| **Propylene Stearate (drums)** | lb. | — | - .40 |

## LUBRICANTS, RUBBER SURFACE

| | | | |
|---|---|---|---|
| Barium Stearate | lb. | .34 | - .36 |
| Calcium Stearate | lb. | .32 | - .34 |
| Glycerized Lubricant | gal. | — | - 1.25 |
| **Polyethylene Glycol** | lb. | .25 | - .26 |
| **Rexanol** | lb. | — | - .13 |
| **Separex** | lb. | — | - .15 |
| **Slab-Dip** | lb. | — | - .15 |
| Wet-Zinc | lb. | — | - .22 |
| Zinc Stearate | lb. | .34 | - .36 |

## MOLD CLEANERS

| | | | |
|---|---|---|---|
| Actusol (dlvd.) | gal. | — | - 1.45 |
| **Metso 99** | cwt. | 3.75 | - 5.40 |
| Granular | cwt. | 3.25 | - 4.75 |
| Rubber-Sol | gal. | — | - 2.75 |
| Shelblast | ton | 80.00 | -140.00 |
| Sprex A.C. (dlvd.) | lb. | — | - .15½ |

## PEPTIZING AGENTS

| | | | |
|---|---|---|---|
| Peptizer P-12 | lb. | .84 | - .90 |
| RPA 2 | lb. | — | - .65 |
| 3 | lb. | — | - .46 |
| 3-RO | lb. | — | - .49 |
| 5 | lb. | — | - .57 |

## PLASTICIZERS & SOFTENERS

| | | | |
|---|---|---|---|
| AA (drums) | lb. | — | - .18¼ |
| Acto 500 | lb. | — | - .09 |
| **Adipol BCA (dms.)** | lb. | .44½ | - .45 |
| 2EH | lb. | 45½ | - .46 |
| 10A | lb. | 44½ | - .45½ |
| American Pine Tar | lb. | .0350 | - .0473 |
| Arneel | lb. | .26 | - .36 |
| **Arolene 1980 (c.l.)** | lb. | — | - .10 |
| Aromatic Tar | gal. | .0573 | - .1973 |
| Bardol | lb. | .02½ | - .03½ |
| B | lb. | .05½ | - .05¾ |
| **Bayol D** | gal. | — | - .382 |
| **F** | gal. | — | - .52 |
| **Beeswax, Refined & Bleached** | lb. | — | - |
| Yellow Refined | lb. | — | - .59 |
| Bondogen | lb. | .55 | - .60 |
| **B.R.C. No. 20** | lb. | .0125 | - .0[illegible] |
| **B.R.H. 2** | lb. | .02 | - .02[illegible] |
| **BRS 700** | lb. | .0175 | - .026 |
| **B.R.T. 3** | lb. | .024 | - .025 |
| **4** | lb. | .0225 | - .0235 |
| **7** | lb. | .0265 | - .0275 |
| B.R.V. | lb. | .0325 | - .049 |
| Bunarex Resins | lb. | .05½ | - .06 |
| **Bunatak M** | lb. | — | - .30 |
| **O** | lb. | — | - .16 |
| **R** | lb. | — | - .14 |
| **U** | lb. | — | - .13 |
| **No. 21** | lb. | — | - .08 |
| **No. 90** | lb. | — | - .08 |
| **No. 865** | lb. | — | - .17 |
| **No. 1080** | lb. | — | - .09½ |
| **Burgundy Pitch** | lb. | .1026 | - .1050 |
| Butac | lb. | .10½ | - .11½ |
| **Butoxyethyl Diglycol Carbonate** | lb. | .40 | - .41 |
| Butyl Benzyl Sebacate | lb. | .52 | - .54½ |
| **Butyl Carbitol Perlargonate (dms.)** | lb. | — | - .642 |
| **Butyl Cellosolve Perlargonate (dms.)** | lb. | — | - .68 |
| **Butyl Palmitate** | lb. | — | - .26½ |
| **Butyl Roleate** | lb. | .176 | - .18 |
| Butyl Stearate-CP (dms.) | lb. | .27 | - .28 |
| **BWH-1** | lb. | — | - .14 |
| **Califlux 510, 550** | lb. | .025 | - .0325 |
| G.P. | lb. | .0125 | - .02 |
| R-100 | lb. | .04½ | - .05¼ |
| TT | lb. | .02 | - .02¾ |
| **Campol (t.c.)** | ton | — | - 42.00 |
| **Candelilla Wax Prime** | lb. | .67 | - .75 |
| Capryl Benzyl Sebacate | lb. | .59½ | - .62 |
| **Carbowax** | lb. | .0325 | - .0375 |
| S Flakes | lb. | .04 | - .045 |
| S Plastic | lb. | .0385 | - .0435 |
| **644** | lb. | .0375 | - .0425 |
| **Carbowax 4000 (drums)** | lb. | .31 | - .32 |
| Cardolite 615 | lb. | .33¾ | - .36¾ |
| 816 | lb. | .25¾ | - .28¾ |
| Carnauba Wax, Crude | lb. | .83 | - .92 |
| Refined | lb. | .87 | - .94 |
| **Substitute** | lb. | .45 | - 1.98 |
| **Yellow** | lb. | 1.15 | - 1.20 |
| **Celluflex** | lb. | .36½ | - .38½ |
| **Ceresine Wax** | lb. | .14 | - .26 |
| Contogum | lb. | .06¾ | - .10¼ |
| CTLA Polymer | gal. | .15 | - .29 |
| **Cumar Resins** | lb. | .05½ | - .14½ |
| **D.C. 200 Fluid** | lb. | 5.20 | - 6.00 |
| **D.B.M.** | lb. | — | - .30 |
| Degras, Common | lb. | — | - .12 |
| Diamylphenol (l.c.l., dms.) | lb. | — | - .28 |
| Dibenzyl Sebacate | lb. | .65 | - .67½ |
| **Dibutoxethyl Sebacate** | lb. | — | - .5634 |
| Diethyl Phthalate (t.c.) | lb. | — | - .24½ |
| Dibutyl Sebacate—Tech. | lb. | .47½ | - .50 |
| C.P. | lb. | .49½ | - .52 |
| Dicapryl Adipate | lb. | .41 | - .43½ |
| Dicapryl Phthalate | lb. | .37 | - .39½ |
| Dicaryl Sebacate | lb. | .53 | - .55½ |
| **Di-Carbitol Phthalate (dms.)** | lb. | .43½ | - .44 |
| Dicyclohexyl Phthalate | lb. | — | - .42 |
| **Dielex** | lb. | .0625 | - .0650 |
| Diethyl Phthalate (t.c.) | lb. | — | - .24½ |
| Dihexyl Adipate | lb. | .32½ | - .35 |
| Dihexyl Phthalate | lb. | .29 | - .31½ |
| Dihexyl Sebacate | lb. | .41 | - .43½ |
| Di Isobutyl Azelate (dms.) | lb. | .54 | - .57 |
| Di-iso-octyl Adipate (dms.) | lb. | .42 | - .44½ |
| Di-iso-octyl Phthalate (t.c.) | lb. | .40 | - .42½ |
| Dimethyl Phthalate | lb. | — | - .25 |
| Dimethyl Sebacate | lb. | .68 | - .70½ |
| **Dinopol (dms.)** | lb. | .523 | - .533 |
| Dioctyl Phthalate (dms.) | lb. | .40 | - .42½ |
| Dioctyl Sebacate (dms.) | lb. | .54 | - .56½ |
| D.I.O.P. (dms.) | lb. | .41½ | - .42½ |
| **Dipolymer Oil** | gal. | .33 | - .38 |

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## PLASTICIZERS & SOFTENERS (Cont'd)

| | | | |
|---|---|---|---|
| **Dispersing Oil No. 10** | lb. | .0525 | .055 |
| **Dutrex A (B, 5, 6)** | lb. | .02½ | .03¾ |
| **15** | gal. | .10 | .189 |
| **20, 21, 25** | lb. | — | .03 |
| Elastex 10-P | lb. | .40 | .42½ |
| 50-B | lb. | .34½ | .37 |
| DCHP | lb. | .42½ | .43½ |
| **Estac** | lb. | — | .16 |
| **Ethox (dms.)** | lb. | .44½ | .45 |
| Flexol B-400 | lb. | .27 | .29 |
| DOP | lb. | .40 | .42½ |
| TOF | lb. | .39½ | .42 |
| 3GH | lb. | .42 | .44 |
| 3GO | lb. | .51½ | .53½ |
| 4GO | lb. | .36 | .38½ |
| 8HP | lb. | .38 | .40½ |
| 8N8 | lb. | .37½ | .40 |
| **Galex W-100** | lb. | .13¾ | .15 |
| **G. B. Light Process Oil** | lb. | .025 | .0325 |
| G. B. Napthenic Neutrals, Harflex 500 (dmsg.) | lb. | .34 | .36½ |
| Hercolyn (dlvd.) | lb. | .16 | .16½ |
| **Herron-H.T.** | gal. | .2400 | .2700 |
| **Herron-Plas** | lb. | .0350 | .0375 |
| **Herron-Wax** | lb. | .0500 | .0550 |
| **HT-200** | lb. | .45¾ | .53 |
| **Indonex 632½ (633½, 634½, 638½)** | gal. | .1100 | .1700 |
| Indopol H-300 (bbls.) | gal | 1.12 | 1.16 |
| **JMH** | lb. | — | .85 |
| Kajsol | lb. | .34½ | .35 |
| KP 23 (dms) | lb. | .34½ | .35 |
| 70 (dms.) | lb. | .38½ | .39 |
| 120 (dms.) | lb. | .37½ | .38 |
| **140 (dms.)** | lb. | .49½ | .50 |
| 150 (dms.) | lb. | .34 | .34½ |
| 201 | lb. | .41¼ | .42 |
| Kremol 40 | gal. | .36 | .46 |
| 50 | gal. | .36 | .46 |
| Kronisol (drums) | lb. | .38½ | .39 |
| Kronitex (drums) | lb. | .30½ | .31 |
| Lanolin, Tech. Anhydrous | lb. | .23 | .25 |
| Lead Oleate | lb. | — | .30½ |
| Lindol | | .29 | .45 |
| **2-Mercaptoethanol (druma)** | lb. | — | .75 |
| **Methox (dms.)** | lb. | .41 | .41½ |
| **Methyl Laurate** | lb. | .25 | .27 |
| **Methyl Oleate** | lb. | — | .20 |
| Methyl Stearate (dms.) | lb. | — | .30 |
| Monoplex DBS | lb. | .51 | .52 |
| Monoplex DOS | lb. | .55½ | .56½ |
| **S (dms.)** | lb. | .70 | .71 |
| 11 (dms.) | lb. | .50 | .51 |
| 16 (dms.) | lb. | .45 | .46 |
| **Montan Substitute No. 506** | lb. | .32 | .33 |
| Montan Wax, Crude | lb. | .18 | .20 |
| Montan Wax (c.l.) | lb. | .15 | .18 |
| Monty Wax | lb. | — | .30½ |
| Natac | lb. | .10 | .11 |
| **Neolene 210 (t.c.)** | lb. | — | .16 |
| **212 (t.c.)** | lb. | — | .14 |
| **220 (t.c.)** | lb. | — | .15 |
| **Nerium** | lb. | — | .09 |
| **Nevillac Resins (dms.)** | lb. | .23 | .45 |
| **Neville Resins (dms.)** | lb. | .10½ | .15½ |
| **Nevindene Resins (dms.)** | lb. | .12½ | .15½ |
| **Nevinol (dms.)** | lb. | — | .17 |
| Nevoil | lb. | .02½ | .04¼ |
| Nevtex 10 (dms.) | lb. | .08¾ | .10½ |
| **Nuba 1 (and 2) (dms.)** | lb. | — | .04 |
| 3X (dms.) | lb. | .05¾ | .06¼ |
| **15 (and 30) Oil (dms.)** | lb. | — | .24 |
| **781 Oil (dms.)** | lb. | — | .27 |
| No. 480 Oil Proof Resin | lb. | — | .13½ |
| Ohopex Q10 (dms.) | lb. | .40½ | .41½ |
| **Opalwax** | lb. | .37 | .38 |
| **Ortho-Nitrobiphenyl** | lb. | .06 | .11 |
| **Ozokerite Wax No. 64 White** | lb. | .31 | .32 |
| **Yellow** | lb. | .25 | .26 |
| P-1 (and 4) | lb. | — | .28½ |
| P-4C | lb. | — | .38½ |
| P-8 | lb. | — | .27½ |
| P-75 | lb. | .66 | .72 |
| **Pale 4 (and 1000)** | lb. | — | .24 |
| Palm Oil | lb. | — | .11 |
| Paradene Resins (dms.) | lb. | .05 | .06 |
| Para Flux (dms.) | gal. | .1825 | .1925 |
| 2016 (dms.) | gal. | .22 | .23 |
| Para Lube (l.c.l.) | lb. | .046 | .048 |
| Paraplex G-25 | lb. | .69 | .70 |
| **G-40** | lb. | .43 | .44 |
| **G-50** | lb. | .39½ | .40½ |
| G-60 | lb. | .39½ | .40½ |
| **Parmo** | lb. | .06 | .13½ |
| **Pepton 22** | lb. | .72 | .75 |
| **PG-16 (druma)** | lb. | — | .23½ |
| Picco 10 (and 25) | lb. | — | .12 |
| 75 (and 100) | lb. | — | .11½ |
| Rubber Resin 100 | lb. | .13¼ | .14 |
| S.O.S. | gal. | .29 | .34 |
| **Piccocizer 30** | lb. | .05½ | .06 |
| **Piccolastic A (and B, C, D, E)** | lb. | .22 | .22½ |
| **F** | lb. | .139 | .144 |
| Piccolyte S Resins | lb. | .0795 | .1245 |
| **Piccolyte WW Resins** | lb. | .45 | .47 |
| Piccoumaron Resins | lb. | .05 | .14½ |
| Piccovar | lb. | .09¼ | .11¼ |
| **Piccoval** | lb. | .02½ | .04 |
| **Pictar** | gal. | .25 | .30 |
| **Plas-Blend 360** | lb. | .03 | .04 |
| **Plastac M** | lb. | — | .09¼ |
| Plasticizer 2286 | lb. | — | .25 |

## PLASTICIZERS & SOFTENERS (Cont'd)

| | | | |
|---|---|---|---|
| **Plasticizer SC** | lb. | .49 | .52 |
| **Plasticizer VA-1** | lb. | — | .40 |
| **Plasticizer XP-3** | lb. | — | .50 |
| **Plastoflex 3** | lb. | — | .50 |
| **50** | lb. | — | .38 |
| J-21 | lb. | — | .41 |
| **Plastogen** | lb. | .07¾ | .08 |
| **Plastolein 9050** | lb. | — | .45 |
| **9055** | lb. | — | .37 |
| **9058** | lb. | — | .45 |
| **9250** | lb. | — | .32 |
| **9715** | lb. | — | .36 |
| **Plastolein X-55 (dms.)** | lb. | — | .60 |
| **X-148 (dms.)** | lb. | — | .70 |
| **Plastone** | lb. | .27 | .30 |
| **Polymel D** | lb. | — | .20 |
| **Polymel Liquid** | gal. | .12 | .17 |
| **Polymel Resins** | lb. | .029 | .05 |
| Process Oil C-225 (c.l.) | gal. | — | .22 |
| Propylene Stearate (dms.) | lb. | — | .32 |
| **PT 400 Pine tar (600, 800) (t.c., dms.)** | lb. | .0350 | .0473 |
| Reogen | lb. | .11¾ | .12 |
| 465 Resin (drums) | lb. | .05 | .05½ |
| Resin 731-C | cwt. | — | 13.50 |
| Resin C | lb. | .0250 | .0335 |
| **Resinex** | lb. | .03½ | .04 |
| **L-4** | lb. | .02½ | .03 |
| **Ridbo 369 (drums)** | lb. | .08 | .09 |
| **369-F (drums)** | lb. | — | .12 |
| **Rosin Oil** | gal. | .54 | 1.20 |
| **R.P.A. No. 2** | lb. | — | .65 |
| **No. 3** | lb. | — | .46 |
| **No. 5** | lb. | — | .57 |
| **R.S.O. Softening Oil** | lb. | .03 | .05 |
| Rubberol | lb. | — | .21½ |
| Rubtar | gal. | — | .40 |
| Santicizer B-16 | lb. | .50 | .52 |
| E-15 | lb. | .47 | .49 |
| M-17 | lb. | .44 | .46 |
| No. 107 | lb. | .40 | .42½ |
| No. 140 | lb. | .29 | .31 |
| No. 141 | lb. | .40 | .42½ |
| No. 160 | lb. | .34 | .36 |
| **Sealol 42** | gal. | — | 1.10 |
| Sherolatum | lb. | .02½ | .04½ |
| Sheroscope L | lb. | .13¾ | .15 |
| **Softener No. 20** | gal. | .09 | .25 |
| **S.P.C.** | lb. | — | .19½ |
| Staflex IXA | lb. | .34 | .36 |
| **Stanolind Petrolatum** | lb. | .037 | .081 |
| **Wax** | lb. | .25 | .30 |
| Staybelite Resin (dms.) | cwt. | — | 9.00 |
| **Sunny South Burgundy Pitch** | lb. | .0774 | .0789 |
| Sunny South Pine Tar | lb. | .0350 | .0473 |
| Sunny South Rosin Oil | gal. | .47 | .63 |
| **Superla Wax** | lb. | .25 | .30 |
| **Syncera Wax** | lb. | .175 | .225 |
| **Synplasticizer** | lb. | — | .10 |
| Syn Tac (c.l.) | gal. | — | .33 |
| Tar, Refined | gal. | .12 | .17 |
| K-Tarnel NR (t.c.) | lb. | — | .0851 |
| Terpene A | gal. | — | .65 |
| **TP-90B** | lb. | — | .65 |
| **TP-95** | lb. | — | .55 |
| TP98 | lb. | — | .50 |
| Tricetin | lb. | .34 | .45 |
| Tricresyl Phosphate | lb. | .29 | .31 |
| Turgum S | lb. | .08¾ | .09¾ |
| Vanadiset A | gal. | .13 | .20 |
| **Vanadiset B, C, D** | lb. | .022 | .055 |
| **Pulverized** | lb. | .064 | .09 |
| **Solution** | gal. | .40 | .65 |
| **Vistac No. 1** | gal. | — | .32 |
| **No. 2** | gal. | — | 1.66 |
| **No. 4** | gal. | — | 1.80 |
| **Witresin—Granular** | ton | 41.00 | 43.00 |
| Solid | ton | 36.00 | 38.00 |

## PROCESSING AIDS

| | | | |
|---|---|---|---|
| Castor Oil, Processed (dms.) | lb. | — | .21¼ |
| Refined (drums) | lb. | — | .16¼ |
| Castorwax (min. 400 lbs.) | lb. | — | .31½ |
| **Dutrex 7** | lb. | .02½ | .03¾ |
| **30** | gal. | .24 | .27 |
| ELA | lb. | — | .80 |
| Heron S.P.O. | lb. | .22 | .23 |
| **Millrex** | lb. | — | .15 |
| Resin No. 510 | lb. | .13¾ | .16½ |
| Zyrox | lb. | .65 | .79 |

## PROTECTIVE & STABILIZING AGENTS

| | | | |
|---|---|---|---|
| Acacia | lb. | .12¾ | .21 |
| **Agchem SA-9 (to SA-12)** | lb. | .65 | 1.02 |
| Alpha Protein | lb. | .19 | .23 |
| Ammonium Alginate | lb. | — | .95 |
| Arootocrat | lb. | — | .07½ |
| **Carob Bean Flour** | lb. | .33 | .35 |
| Casein | lb. | .21 | .28 |
| **Ethylene Diamine 68%** | lb. | .57 | .58 |
| Karaya Gum | lb. | .20 | .50 |
| Polycin 781 | lb. | — | .22½ |
| Prosein | lb. | .0575 | .0605 |
| **Rex Compound No. 2801** | lb. | — | .15 |
| Stablex B | lb. | — | .95 |
| Tragacanth Flakes | lb. | .60 | 1.35 |

## RECLAIMING AGENTS

| | | | |
|---|---|---|---|
| **Armeers C** | lb. | .50 | .58 |
| **T** | lb. | .42 | .50 |
| **No. 517 H.B. Oil** | gal. | .11½ | .16½ |
| 535 | gal. | .22 | .27 |
| **C-6 Oil (and 28, 32)** | gal. | .33 | .38 |

## RECLAIMING AGENTS (Cont'd)

| | | | |
|---|---|---|---|
| **C-10 Oil** | gal. | .25 | .30 |
| C-33 Oil | gal. | .17½ | .22½ |
| **Caustic Soda—Flake 76% (c.l., drums)** | cwt. | — | 3.45 |
| **Liquid 50% (t.c.)** | cwt. | — | 2.40 |
| **Solid 76% (c.l., dms.)** | cwt. | 2.50 | 3.05 |
| Creaylic Acid (99-100%) | gal. | 1.55 | 1.69 |
| **D-4** | gal. | .23 | .28 |
| **E-5** | gal. | .21 | .26 |
| **G. B. Reclaiming Oil** | gal. | .12 | .18 |
| **Heavy Aromatic Naphtha (t.c.)** | gal. | — | .125 |
| LX-77 Reclaiming Solvent | gal. | .21 | .30 |
| LX-572 Reclaiming Oil | gal. | .23 | .28 |
| **Neo-Fat D-242** | lb. | .05½ | .07¼ |
| PKR 1 | gal. | .15 | .35 |
| **PT 67 Light pine oil** | gal. | .60 | .70 |
| PT 101 Pine tar oil | lb. | .0350 | .0473 |
| **PT 150 Pine solvent** | gal. | .44 | .45 |
| **Q Oil** | gal. | .246 | .296 |
| **Reclaiming Oil 1621** | lb. | .03 | .04 |
| Reclaiming Oil 3186 (t.c.) | gal. | .28 | .38½ |
| Reclaiming Oil 3186-G | gal. | .25 | .36½ |
| **Reclaiming Reagent No. 4** | lb. | .12 | .15 |
| **R.P.A. No. 3** | lb. | — | .46 |
| **Soda Ash (c.l., bags)** | cwt. | — | 1.40 |
| Solvenol 1 (dms.) | | — | .36 |
| Solvent 534 | gal. | .20¼ | .26½ |
| **Solvent Oil 21** | gal. | .24 | .29 |
| C-42 | gal. | .25 | .30 |
| Union Solvent 4060-O | gal. | — | .147 |
| X-1 Resinous Oil | lb. | .0190 | .0250 |
| **X-60 Solvent** | gal. | .24 | .32 |

## REINFORCING AGENTS—CARBON BLACK

### Channel, Hard Processing (HPC) (bags)

| | | | |
|---|---|---|---|
| Atlantic HPC-98 | lb. | .0690 | .1175 |
| Continental F | lb. | .0690 | .1125 |
| Croflex | lb. | .0690 | .1125 |
| Crow | lb. | .0690 | .1125 |
| Dixiedensed (and S) | lb. | .0690 | .1125 |
| Kosmobile (and S) | lb. | .0690 | .1125 |
| Kosmos T | lb. | .0690 | .1125 |
| Micronex HPC | lb. | .0690 | .1125 |
| Spheron 4 | lb. | .0690 | .1170 |
| Witco Disperso No. 6 | lb. | .0690 | .1125 |

### Channel, Medium Processing (MPC) (bags)

| | | | |
|---|---|---|---|
| Atlantic MPC-95 | lb. | .0690 | .1175 |
| Continental A | lb. | .0690 | .1125 |
| Croflex TH | lb. | .0690 | .1125 |
| Dixie R-1 | lb. | .0690 | .1125 |
| Dixiedensed HM (and S-66) | lb. | .0690 | .1125 |
| Huber Arrow TX | lb. | .0690 | .1150 |
| Kosmobile HM (and S-66) | lb. | .0690 | .1125 |
| Kosmos M | lb. | .0690 | .1125 |
| Micronex Standard | lb. | .0690 | .1175 |
| Spheron 6 | lb. | .0690 | .1170 |
| Texas M | lb. | .0690 | .1125 |
| Witco Disperso No. 1 | lb. | .0690 | .1125 |

### Channel, Easy Processing (EPC) (bags)

| | | | |
|---|---|---|---|
| Atlantic EPC E-42 | lb. | .0690 | .1175 |
| Continental AA | lb. | .0690 | .1125 |
| Croflex 77 | lb. | .0690 | .1125 |
| Dixiedensed 77 | lb. | .0690 | .1125 |
| Kosmobile 77 | lb. | .0690 | .1125 |
| Micronex W-6 | lb. | .0690 | .1175 |
| Spheron 9 | lb. | .0690 | .1170 |
| Texas E | lb. | .0690 | .1125 |
| Witco Disperso No. 12 | lb. | .0690 | .1125 |
| Wyex | lb. | .0690 | .1150 |

### Channel, Conductive (CC) (bags)

| | | | |
|---|---|---|---|
| Dixie 5 dustless | lb. | .0800 | .1375 |
| Kosmink dustless | lb. | .0800 | .1375 |
| **Spheron C** | lb. | .1200 | .1600 |
| **Spheron N** | lb. | .2200 | .2500 |
| Voltex | lb. | .1800 | .2150 |

### Furnace, Fast Extruding (FEF) (bags)

| | | | |
|---|---|---|---|
| Statex M | lb. | .0550 | .0950 |

### Furnace, High Modulus (HMF) (bags)

| | | | |
|---|---|---|---|
| Continex HMF | lb. | .0500 | .0900 |
| Dixie 40 | lb. | .0500 | .0900 |
| **Dixie 50** | lb. | .0550 | .0950 |
| Kosmos 40 | lb. | .0500 | .0900 |
| **Kosmos 50** | lb. | .0550 | .0950 |
| Modulex | lb. | .0500 | .0900 |
| Statex 93 | lb. | .0500 | .0900 |
| Sterling L | lb. | .0500 | .0900 |
| **Sterling SO** | lb. | .0550 | .0950 |

### Furnace, Medium Abrasion (MAF) (bags)

| | | | |
|---|---|---|---|
| Philblack A | lb. | .0550 | .0950 |

### Furnace, Reinforcing (RF) (bags)

| | | | |
|---|---|---|---|
| **Dixie 60** | lb. | .0740 | .1125 |
| **Kosmos 60** | lb. | .0740 | .1125 |

### Furnace, Semi-Reinforcing (SRF) (bags)

| | | | |
|---|---|---|---|
| Continex SRF | lb. | .0350 | .0775 |
| Dixie 20 | lb. | .0350 | .0750 |
| Essex | lb. | .0350 | .0775 |
| Furnex | lb. | .0350 | .0750 |
| Gastex | lb. | .0350 | .0750 |
| Kosmos 20 | lb. | .0350 | .0750 |
| Pelletex | lb. | .0350 | .0750 |
| Seminex | lb. | .0350 | .0775 |
| Sterling NS | lb. | .0350 | .0750 |
| Sterling R | lb. | .0350 | .0750 |
| Sterling S | lb. | .0350 | .0750 |

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### REINFORCING AGENTS—CARBON BLACK (Cont'd)

**Furnace, Fine (FF) (bags)**

| | | | |
|---|---|---|---|
| Statex B | lb. | .0575 - | .0975 |
| Sterling 99 | lb. | .0650 - | .1050 |
| Sterling 105 | lb. | .1200 - | .1600 |

**Furnace, High Abrasion (HAF) (bags)**

| | | | |
|---|---|---|---|
| Aromex | lb. | .0740 - | .1125 |
| Philblack O | lb. | .0740 - | .1140 |
| Vulcan 3 | lb. | .0740 - | .1170 |

**Furnace, Very Fine (VFF) (bags)**

| | | | |
|---|---|---|---|
| Statex K | lb. | .0740 - | .1200 |

**Thermal, Fine (FT) bags)**

| | | | |
|---|---|---|---|
| P-33 | lb. | — - | .0500 |

**Thermal, Medium (MT) (bags)**

| | | | |
|---|---|---|---|
| Thermax (c.l.) | lb. | — - | .0300 |
| Thermax, Stainless | lb. | — - | .0350 |

### REINFORCING AGENTS—MISCELLANEOUS

| | | | |
|---|---|---|---|
| Darex Copolymer No. 3 (and X34) | lb. | .35 - | .42 |
| No. X43 | lb. | .36 - | .38 |
| Darex Copolymer Latex No. 3 (and X34) | lb. | .36½ - | .50 |
| Durez 12687 (and 12707) | lb. | — - | .32 |
| Durez 13355 | lb. | — - | .26 |
| Good-Rite Resin 50 | lb. | .36 - | .38 |
| Marbon S and S-1 | lb. | .36 - | .43 |
| 8000 | lb. | .36 - | .43 |
| Marmix | lb. | .36 - | .43 |
| Pliolite Latex 190 | lb. | .35 - | .39 |
| Pliolite S6 Resin | lb. | .36 - | .37 |
| C-3 Masterbatch | lb. | .47 - | .48 |
| C-4 Masterbatch | lb. | .45 - | .46 |
| G Masterbatch | lb. | .35 - | .36 |
| G50 Masterbatch | lb. | .35 - | .36 |
| N Masterbatch | lb. | .40 - | .41 |
| R Masterbatch | lb. | .38 - | .39 |
| Polyco 220 | lb. | .13 - | .15 |

### RETARDERS

| | | | |
|---|---|---|---|
| Dutch Boy Normasal | lb. | — - | .41¾ |
| ESEN | lb. | — - | .36 |
| Retarder ASA | lb. | — - | .45 |
| Retarder W | lb. | — - | .43 |
| Retardex | lb. | .47 - | .50 |

### RUBBER SUBSTITUTES

**Mineral Rubber**

| | | | |
|---|---|---|---|
| 38 | ton | 38.00 - | 40.00 |
| Black Diamond | ton | 38.00 - | 40.00 |
| Byerlyte | ton | 47.00 - | 54.00 |
| Gilsonite, Selects (c.l.) | ton | 33.50 - | 36.00 |
| Hard Hydrocarbon (dms.) | ton | 42.50 - | 44.50 |
| Herron Flake | ton | 48.50 - | 49.50 |
| Mineral Rubber, solid | ton | 42.50 - | 44.50 |
| Pioneer | ton | 35.00 - | 46.00 |

**Vulcanized Vegetable Oils (Factice)**

| | | | |
|---|---|---|---|
| Amberex | lb. | .28 - | .32 |
| Brown | lb. | .1310 - | .1955 |
| Dispersed | lb. | .22 - | .42 |
| Neophax | lb. | .16 - | .24 |
| White | lb. | .13 - | .24 |

**Miscellaneous Rubber Substitutes**

| | | | |
|---|---|---|---|
| G.B. Asphaltenes | lb. | .06 - | .06½ |
| Gilsowax | lb. | .04½ - | .05 |
| Insulac | lb. | .06 - | .06½ |
| Resin No. 1098 (drums) | lb. | — - | .62 |
| No. 1198 | lb. | .46¾ - | .49¾ |

### SOLVENTS

| | | | |
|---|---|---|---|
| Acetone (dlvd.) | lb. | .07½ - | .09½ |
| American Dipentine | gal. | .35 - | .36 |
| American Pine Oil | gal. | .60 - | .61 |
| Amsco Lactol Spirits (t.c.) | gal. | — - | .16 |
| Rubber Solvent (t.c.) | gal. | — - | .15 |
| Solv A (t.c.) | gal. | — - | .20 |
| Solv A-80 (t.c.) | gal. | — - | .24 |
| Solv B (t.c.) | gal. | — - | .23½ |
| Solv B-90 (t.c.) | gal. | — - | .26½ |
| Solv D (t.c.) | gal. | — - | .25½ |
| Solv F (t.c.) | gal. | — - | .25½ |
| Special Naphthalite (t.c.) | gal. | — - | .15 |
| Textile Spirits (t.c.) | gal. | — - | .16 |
| Amyl Chlorides, Mixed (t.c.l.) (drums) | lb. | — - | .08 |
| Aromatic Solvent 40 | gal. | — - | .199 |
| Benzol 90% | gal. | .17 - | .24 |
| Butyl Acetate (t.c.) | lb. | — - | .175 |
| Butyl Alcohol (t.c.) | lb. | — - | .175 |
| Secondary (dlvd.) | lb. | .09 - | .11 |
| Tertiary (dlvd.) | lb. | .12 - | .14 |
| Carbon Bisulfide, Tech. | lb. | .05½ - | .08½ |
| Carbon Tetrachloride | lb. | .08 - | .08½ |
| Cosol 1 | gal. | .30 - | .38 |
| Cosol 2 | gal. | .30 - | .38 |
| Cyclohexane | lb. | .09¼ - | .11½ |
| Cyclohexanone | lb. | .25 - | .27 a |
| Diacetone, Pure (dlvd.) | lb. | .12 - | .14 |

### SOLVENTS (Cont'd)

| | | | |
|---|---|---|---|
| Dichlorethyl Ether (dms.) | lb. | .165 - | .17 |
| Formal (dms.) | lb. | .265 - | .27 |
| Dichloropentane (t.c.l.) | lb. | .04 - | .05½ |
| Dipentene 122 (dms.) | gal. | .35 - | .36 |
| Ethyl Alcohol (t.c.) | gal. | — - | .375 |
| Ethyl Alcohol SD-1 (t.c.) | gal. | — - | .43 |
| Ethyl Alcohol SD-2B (t.c.) | gal. | — - | .41½ |
| Ethylene Dichloride (drums, dlvd.) | lb. | .08 - | .09½ |
| Halowax Oil | lb. | .25 - | .37 |
| Heptanes (t.c.) | gal. | — - | .16 |
| Hexalin Cyclohexanol | lb. | .20 - | .22 a |
| Hexanes (t.c.) | gal. | — - | .16 |
| Isopropyl Alcohol, Ref. 99% (dlvd.) | gal. | .35 - | .48 |
| Ether, Ref. (dlvd.) | gal. | .04½ - | .06½ |
| Mesityl Oxide (dlvd.) | lb. | .115 - | .135 |
| Methanol (dms., dlvd.) | gal. | .43 - | .495 |
| Methyl Acetone, Syn. (drums, dlvd.) | gal. | .615 - | .65 |
| Methyl n-Amyl Ketone (drums) | lb. | .37 - | .39 |
| Methyl Ethyl Ketone | lb. | .09 - | .11 |
| Methyl Isobutyl Ketone (dlvd.) | lb. | .11 - | .13 |
| N-5 Pentane Mix. (t.c.) | gal. | — - | .11½ |
| N-6 Hexanes (t.c.) | gal. | — - | .14 |
| N-7 Hexanes (t.c.) | gal. | — - | .13 |
| Petrolene (t.c.) | gal. | — - | .10½ |
| Picolines, Aplha, Refined | lb. | .75 - | 1.00 |
| Mixed | lb. | — - | .45 |
| Proprietary Alcohol (t.c.) | gal. | — - | .43½ |
| Pyridine, Refined | lb. | .80 - | .89 |
| Quinoline | lb. | .50 - | .60 |
| Rubber Solvent (t.c.) | gal. | — - | .15 |
| Rubsol (t.c.) | gal. | — - | .08625 |
| Skellysolve B (Hexanes (t.c.) | gal. | — - | .141 |
| C (Heptanes) (t.c.) | gal. | — - | .133 |
| E (Octanes) (t.c.) | gal. | — - | .155 |
| R (Solvent Naphtha) | gal. | — - | .109 |
| Solvenol (dms.) | gal. | — - | .36 |
| Solvent, Crude, Light | gal. | .19 - | .28 |
| Solvesso 100 (t.c.) | gal. | — - | .27 |
| 150 (t.c.) | gal. | — - | .27 |
| Sunny South Dipentene | gal. | .35 - | .36 |
| Sunny South Pine Oil | gal. | .60 - | .61 |
| Toluene (drums) | gal. | — - | .28 |
| Toluol (t.c.) | gal. | — - | .30 |
| Trichlorethane | lb. | .11 - | .12 |
| Triglycol Dichloride (dms.) | lb. | .519 - | .59 |
| Tromex | lb. | .078 - | .083 |
| Union Thinner 1 | gal. | — - | .149 |
| 3 | gal. | — - | .149 |
| 7 | gal. | — - | .139 |
| 2-50-W Hi-Flash | gal. | — - | .35 |
| X-7 Sp. Heptanes (t.c.) | gal. | — - | .11 |
| Xylene (drums) | gal. | — - | .30 |

### STABILIZING AGENTS (for Vinyl Resins)

| | | | |
|---|---|---|---|
| Basic Silicate White Lead | lb. | .14¾ - | .15¾ |
| BVS | lb. | — - | .60 |
| Cadmium Stearate | lb. | — - | 1.25 |
| Dutch Boy DS-207 | lb. | — - | .50¾ |
| Plumb-O-Sil A | lb. | — - | .28 |
| B | lb. | — - | .29½ |
| Tribase | lb. | — - | .24¼ |
| Dythal | lb. | — - | .37½ |
| Lead Stearate, Precip. | lb. | .36 - | .38 |
| Fused | lb. | — - | .35½ |
| Lithium Stearate | lb. | .63 - | .65 |
| Stabelan E | lb. | 1.25 - | 1.40 |
| XL | lb. | .55 - | .65 |
| Stabilizer V-7939 | lb. | — - | .60 |
| Stabilizer JCX | lb. | .49 - | .51 |
| SN | lb. | — - | .42 |
| V-1-N | lb. | .44 - | .50 |
| V-9 | lb. | — - | .85 |
| Vanstay | lb. | .33 - | .35 |

### SUN CHECKING AGENTS

| | | | |
|---|---|---|---|
| Antisol | lb. | .25 - | .26 |
| Antisun | lb. | — - | .23 |
| Heliozone | lb. | .25 - | .26 |
| Sharples Wax | lb. | .23 - | .28 |
| Sunolite | lb. | .20 - | .23 |
| Sunproof | lb. | .25 - | .26 |
| Imp. | lb. | .23 - | .24 |
| Jr. | lb. | .18 - | .19 |
| Tonox | lb. | .50 - | .52 |

### TACKIFIERS

| | | | |
|---|---|---|---|
| Advaresin 100 | lb. | .13½ - | .14 |
| Agchem RC 30 | gal. | .65 - | 1.34 |
| Amberol ST-137X | lb. | .30 - | .30½ |
| Arcco 493-49B | lb. | .15 - | .17 |
| 700-25A | lb. | .14 - | .16 |
| U2-24 | lb. | .11 - | .13 |
| Beckopol 1400 (dlvd.) | lb. | .25½ - | .26 |
| Dutrex 44 | gal. | — - | .919 |
| E-310 Resin Emulsion | lb. | — - | .14 |
| Galex (drums) | lb. | — - | .15 |
| Koresin | lb. | .73 - | .75 |
| Liquid Rubber Flux | lb. | — - | .125 |
| Pentalyn A (dlvd.) | lb. | .13 - | .13½ |
| Resin V | lb. | — - | .23¼ |
| Rubtack | lb. | — - | .12 |
| Staybelite Ester No. 10 (dlvd.) | lb. | .19 - | .19½ |
| Super-Beckacite No. 1001 (dlvd.) | lb. | .34 - | .34½ |
| Synthol | lb. | — - | .20½ |
| Vistac No. 1 | gal. | — - | 1.32 |
| No. 2 | gal. | — - | 1.66 |
| No. 4 | gal. | — - | 1.80 |

### THICKENERS (FOR LATEX)

| | | | |
|---|---|---|---|
| Acrysol GS | lb. | .13 - | .18½ |
| Alcogum A-5 | lb. | .10 - | .12 |
| Betanol (drums) | lb. | — - | .70 |
| Emulsorex No. 5 | lb. | — - | .35 |
| Lecithin | lb. | .12 - | .17 |
| Polyco 296 | lb. | .13 - | .15 |
| Propylene Laurate (dms.) | lb. | — - | .36 |
| Sodium Silicate | cwt. | 1.10 - | 2.00 |

### VULCANIZING AGENTS

**Selenium**

| | | | |
|---|---|---|---|
| Ancasal* | lb. | — - | 2.00 |
| Vandex | lb. | — - | 2.00 |

**Sulfur**

| | | | |
|---|---|---|---|
| Blackbird | cwt. | — - | 2.30 |
| Crystex | lb. | .19½ - | .21 |
| Darex Dispersed Sulphur | lb. | .12 - | .17 |
| Dispersed Sulfur | lb. | .12 - | .17 |
| Devil (c.l.) | cwt. | — - | 1.75 |
| Insoluble Sulfur 60 | lb. | .13 - | .13½ |
| Spider | cwt. | — - | 2.30 |
| Star (c.l.) | cwt. | — - | 2.25 |
| Tire (c.l.) | cwt. | — - | 1.75 |
| Tube (c.l., dlvd.) | cwt. | — - | 2.25 |

**Tellurium**

| | | | |
|---|---|---|---|
| Ancatel* | lb. | — - | 2.00 |
| Latex Telloy | lb. | — - | 2.00 |
| Telloy | lb | — - | 2.00 |

**Miscellaneous Vulcanizing Agents**

| | | | |
|---|---|---|---|
| VA-3 | lb. | .55 - | .65 |

### WASHING & FINISHING AGENTS

| | | | |
|---|---|---|---|
| Apcolene (t.c.) | gal. | — - | .09½ |

### WETTING AGENTS

| | | | |
|---|---|---|---|
| Advawet No. 10 | lb. | — - | .35 |
| No. 15 | lb. | — - | .18 |
| No. 33 | lb. | .40 - | .43 |
| Aerosol OT 70% Clear | lb. | .80 - | 1.00 |
| Agchem SA-15 (16, 18) | lb. | .17 - | .29 |
| Alrosol (dms.) | gal. | — - | .48 |
| Aquarex D | lb. | — - | .76 |
| MDL Paste | lb. | — - | .30 |
| ME | lb. | — - | .92 |
| NS | lb. | — - | .60 |
| WA Paste | lb. | — - | .25 |
| Areakap 50 | lb. | .30 - | .38 |
| Dry 100 | lb. | .60 - | .72 |
| Aresket 240 | lb. | .30 - | .38 |
| Dry 300 | lb. | .60 - | .72 |
| Aresklene 375 | lb. | .42 - | .57 |
| Dry 400 | lb. | .70 - | .84 |
| Armacs | lb. | .29 - | .76 |
| Arquads | lb. | .24 - | .27 |
| Etho-chemicals | lb. | .34 - | .80 |
| Lecithin | lb. | .12 - | .17 |
| Parmol | lb. | .13 - | .18 |
| Santomerse D | lb. | .43 - | .65 |
| S | lb. | .12 - | .25 |
| Sorbit P | lb. | — - | .28 |
| Stablex G | lbs. | — - | .70 |
| Trenamine W-50 | lb. | .20 - | .22 |
| Triton K-60 | lb. | .33½ - | .41 |
| R-100 | lb. | .13½ - | .24 |
| X-100 | lb. | .37 - | .44½ |
| X-200 | lb. | .30½ - | .38 |
| 770 | lb. | .19½ - | .27 |
| Vultamol | lb. | — - | .17½ |
| Wetsit Conc. | lb. | .25 - | .32 |

### MISCELLANEOUS CHEMICALS

| | | | |
|---|---|---|---|
| Acto 450 (550-W, 600, 630) | lb. | .109 - | .145 |
| Agchem SA-17 | lb. | — - | .29 |
| Aquarex SMO | lb. | — - | .50 |
| A.S.T.M. Oil No. 1 (and No. 3) | gal. | 1.00 - | 1.15 |
| Copper Inhibitor X-872-L | lb. | — - | 1.95 |
| 2-Ethylhexanol (dms.) | lb. | .25 - | .26 |
| Glycerine, 88% Sap., Crude (dlvd.) | lb. | .20½ - | .21 |
| MODX | lb. | .295 - | .345 |
| NBC | lb. | — - | 1.50 |
| Para Resin No. 2457 (c.l.) | lb. | — - | .04 |
| No. 2718 (c.l.) | lb. | — - | .04 |
| Pigmented Filmite | lb. | — - | .16½ |
| Polyvinyl Methyl Ether | lb. | — - | 1.00 |
| Reference Fluid SR-6 | gal. | — - | 1.00 |
| SR-1 | gal. | .60 - | .75 |
| Resin No. 1226 | lb. | .31½ - | .36½ |
| Rio Resin | lb. | .50 - | .52 |
| Santocel | lb. | — - | .50 |
| Sherosope L, N, F-445 and P | lb. | .12½ - | .15 |
| Sublac | lb. | .30 - | .32 |
| Synpep N (drums) | lb. | — - | .54 |
| Thiokol LP-2 | lb. | — - | .90 |
| LP-3 | lb. | — - | .90 |
| Tysonite | lb. | .21½ - | .22¼ |
| Vanfre | gal. | 2.00 - | 2.50 |
| Vinsol Resin—Lumps | cwt. | — - | 3.25 |

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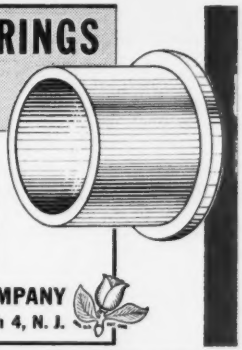

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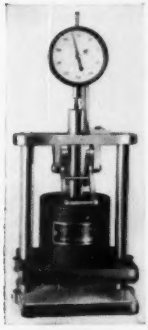

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RUBBER and PLASTICS CHEMIST: B. S., fourteen years experience development, production, management in tires, cables, mechanicals, adhesives, etc. Desires change. Stimulating and responsible position with progressive company. Eastern location preferred. Married. Age thirty-five. Address Box 698-P, RUBBER AGE.

## HELP WANTED

WANTED: Experienced cost estimator for extruded and molded goods by Michigan manufacturer employing three hundred. Time study and methods experience desirable but not necessary. Address Box 650-W, RUBBER AGE.

LATEX COMPOUNDER: College graduate with two or three years experience in latex for laboratory work. Address Box 680-W, RUBBER AGE.

WANTED: Young or middle aged man with good command of English and good technical knowledge of general rubber compounding to edit technical laboratory reports. Address Box 681-W, RUBBER AGE.

WANTED: Man experienced in manufacturing insulated wire and cable. Knowledge of production planning and production control essential. Please give as complete information as possible in the first letter. Our own organization knows of this advertisement. Address Box 682-W, RUBBER AGE.

### TIRE DEVELOPMENT ENGINEER

Tire manufacturer not one of Big Four, has opening for well qualified engineer with experience in tire construction. Excellent opportunity for right man. Give full particulars about past experience in first letter. Replies held in strict confidence. Address Box 684-W, RUBBER AGE.

TECHNICAL SALES representative, 25-35 years. Some laboratory experience with rubber and plastics, to represent color dispersion manufacturer in Middle Atlantic states. Exceptional opportunity. State salary, experience and references. Address Box 701-W, RUBBER AGE.

## HELP WANTED (Continued)

### CHEMICAL ENGINEER

**Rubber Chemist with good experience as compounder and chemist in the rubber industry. Background of development and factory trouble shooting in the manufacture of mechanical and sponge rubber required. Write, stating age, experience, background, etc., to the**

**DAVIDSON RUBBER COMPANY**
**50 Brighton Stret** **Charlestown, Mass.**

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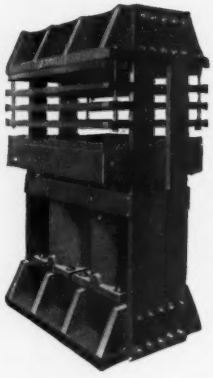

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